

# ASTOUNDING

SCIENCE-FICTION

A STREET & SMITH PUBLICATION

LOGIC OF EMPIRE

By ROBERT HEINLEIN

MARCH • 1941

20¢



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# ASTOUNDING

SCIENCE-FICTION

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# INDUSTRIAL PROCESS

SOME of the most important inventions are the ones that practically no one ever sees in use—only the products appear, and seem no different than the old, or appear simply as an obvious need.

I've been wondering recently how much good it would do a man if he had a time machine capable of a sort of one-shot dredging operation. Suppose the machine could pick up any one desired object of fifty years hence and bring it back, but, by some reason of inherent limitation, could never operate again or be duplicated. What to pick up? What class of thing to aim at?

Well, a fighting plane of fifty years hence might make a good bet, things being as they are. But let's consider, first, before making our one available collection. What sort of thing are we apt to drag back? From present knowledge, there's a fair-to-middling chance that it may not have atomic power, but it's practically certain it will. That would be a help?

No, that would be completely infuriating in all probability. It would be an atomic engine designed for a highly refined, blended atomic fuel, probably composed of pure isotopes, and probably not using U-235. If it did, we'd know how to make a U-235 engine—interesting, but useless until we learn how to make U-235. If it used some other pure isotope, the knowledge of the possibility would be equally academic and impractical.

Further, it would probably be constructed in what would appear to our eyes as a very flimsy manner—metal foils and a breath of plastic sprayed here and there. Only the metal foils would turn out to have a most indecent amount of stiffness and strength, and the plastics would probably display properties blending those of rubber, hard steel, and clear glass. Fine! But they would contain no clue as to how they were made. Freshly mixed duraluminum alloy, if simply cast into billets, is a completely useless sort of metal—soft, no stiffness, no good. Analysis will tell readily enough what it's composed of. Analysis of the finished, heat-treated and age-hardened dural will give exactly the same answer—but a stiffness, hardness and tensile strength reading that belongs in a different category. But you can't analyze for heat treatment.

Then there might be a little but very necessary filter somewhere in the engine, composed of a pure-gold mesh containing 10,000 perfectly square holes to the inch, 100,000,000 to the square inch, in a perfectly flat, tenth-inch-thick metal plate. There you have the thing—you know what to make. But try and make that! The industrial process necessary doesn't exist yet. Or it might be a condenser one-inch cube that operates at 10,000 volts, its plates being pure silver foil a hundred thousandth of an inch thick separated by half a hundred thousandth of an inch of some clear, water-white plastic substance that simply doesn't conduct electricity. Chemical analysis finally reveals its structure—and that it is a structure that all present laws of chemistry say can exist, once made, but can't be made because it involves reversing the natural direction of reactions.

Then there are the machine guns. Remarkably enough, they're rather small and don't use cartridges at all! They use little .22-caliber tungsten metal bullets, but the automatic breech-loading mechanism takes raw powder, measures it out, jams it in behind the automatically inserted bullet, locks the breech, and fires—all in one five hundredth of a second! It's simple enough mechanism, really, and tests show it never jams, doesn't involve useless weight of cartridges, can be reloaded by merely dumping in bags of powder and bullets, and is astoundingly deadly. But—the parts must be accurate to two millionths of an inch, and are made of stainless, nonrusting tungsten alloy, ten times harder than the best steel, and six times stronger. The composition of the alloy's easy to determine—but when we alloy that mixture it doesn't alloy—it simply separates out in layers. (What we don't know is that it's made by treating pure tungsten to special atomic bombardment that transmutes some—a carefully determined percentage—of the atoms to the desired alloy elements, followed by intense supersonic heat treatment. It wouldn't do us any good if we did know; we haven't the atomic power plants necessary to supply the bombardment.)

Most gadgets exist only by reason of the immense technology behind them, and in fifty years the whole technology will be replaced by a new one. If Hertz had been presented, via some time machine, with a modern radio in honor of his achievement in discovering radio waves, he couldn't have duplicated it, or built a transmitter from which to receive signals. The tubes have tungsten filaments; before the electric light was developed, tungsten could not be worked at all. Hertz couldn't have made a tungsten filament. The filaments are coated with various oxides to increase their electron emissivity. I wonder how long it would have been before scientists of that day would have discovered that those thin layers of oxide weren't accidental impurities, but very necessary?

And what an unholy job the chemists would have had trying to analyze bakelite! The plastic product of the phenol-formaldehyde reaction has a molecule that doesn't suggest a trace of its simple origin! Anything capable of taking bakelite into a respectable, analyzable solution immediately destroys the molecule hopelessly.

Literally, for once, it is true that any jack-leg radio mechanic knows more about it than the guy who invented radio!

But the inventions—bakelite, tungsten wire-drawing, thorium impregnation of filaments—that make radio and a thousand other wonderful inventions work are the unseen, seldom-realized industrial process, not the bold and sweeping discovery that everybody knows about.

If you don't happen to know, try figuring out how tungsten might be drawn into wire. It melts at 3,500° Centigrade, doesn't soften much below 3,000°, both of which temperatures are higher than the melting point of any refractory save graphite—which can't be used because tungsten reacts with it. Tungsten, being too refractory to melt, is produced from its ores in the form of a powder. The trick is to get it from powder to fine wire under those conditions, plus the added one that it burns to oxide if heated in air. Tungsten doesn't plate satisfactorily, so that's out. Try figuring it out.

THE EDITOR.

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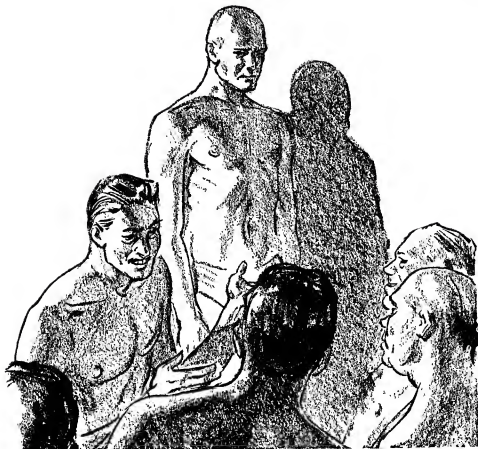
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# LOGIC OF EMPIRE

By Robert Heinlein

***It wasn't really slavery—but they sold men's labor on the auction block. And a man could quit any time he paid his debts—if he worked and didn't eat. But that was the way of empire.***

Illustrated by Schneeman

"DON'T be a sentimental fool, Sam!"

"Sentimental or not," Jones persisted, "I know human slavery when I see it. That's what you've got on Venus."

Humphrey Wingate snorted. "That's utterly ridiculous. The com-

pany's labor clients are employees, working under legal contracts, freely entered into."

Jones' eyebrows raised slightly. "So? What kind of a contract is it that throws a man into jail if he quits his job?"

"That's not the case. Any client

can quit his job on the usual two-weeks' notice. I ought to know; I—"

"Yes, I know," agreed Jones in a tired voice. "You're a lawyer. You know all about contracts. But the trouble with you, you dunderheaded fool, is that all you understand is legal phrases. Free contract—nuts! What I'm talking about is *facts*, not legalisms. I don't care what the contract says—those people are slaves."

Wingate emptied his glass and set it down. "So I'm a dunderheaded fool, am I? Well, I'll tell you what you are, Sam Houston Jones—you are a half-baked parlor pink. You've never had to work for a living in your life, and you think it's just too dreadful that anyone else should have to. No, wait a minute," he continued as Jones opened his mouth, "listen to me. The company's clients on Venus are a damn sight better off than most people of their own class right here on Earth. They are certain of a job, of food, and a place to sleep. If they get sick, they're certain of medical attention. The trouble with people of that class is that they don't want to work—"

"Who does?"

"Don't be funny. The trouble is, if they weren't under a fairly tight contract, they'd throw up a good job the minute they got bored with it and expect the company to give 'em a free ride back to Earth. Now it may not have occurred to your fine, free charitable mind, but the company has obligations to its stockholders—you, for instance!—and it can't afford to run an interplanetary ferry for the benefit of a class of people that feel that the world owes them a living."

"You got me that time, pal," Jones acknowledged with a wry face, "with that crack about me being a stockholder. I'm ashamed of it."

"Then why don't you sell?"

Jones looked disgusted. "What kind of a solution is that? Do you think I can avoid the responsibility of *knowing* about it just by unloading my stock?"

"Oh, the devil with it," said Wingate. "Drink up."

"Right-o," agreed Jones. It was his first night aground after a practice cruise as a reserve officer; he needed to catch up on his drinking. Too bad, thought Wingate, that the cruise should have touched at Venus—"ALL OUT! All out! Up, a-a-a-all you idlers! Show a leg there! Show a leg and grab a sock!" The raucous voice sawed its way through Wingate's aching head. He opened his eyes, was blinded by raw white light, and shut them hastily. But the voice would not let him alone. "Ten minutes till breakfast," it rasped. "Come and get it or we'll throw it out!"

He opened his eyes again, and with trembling will power forced them to track. Legs moved past his eyes, denim-clad legs; mostly, though some were bare—repulsiveness expressed in hairy nakedness. A confusion of male voices, from which he could catch words, but not sentences, was accompanied by an obligato of metallic sounds, muffled but pervasive—*shr-rg, shr-rg, thump! Shr-rg, shr-rg, thump!* The thump with which the cycle was completed hurt his aching head, but was not as nerve-stretching as another noise, a toneless whirring sibilance which he could neither allocate nor escape.

The air was full of the odor of human beings, too many of them in too small a space. There was nothing so distinct as to be fairly termed a stench, nor was the supply of oxygen inadequate. But the room was filled with the warm, slightly musky smell of bodies still heated by bedclothes,

bodies not dirty, but not freshly washed. It was oppressive and unappetizing—in his present state almost nauseating.

He began to have some appreciation of the nature of his surroundings; he was in a bunkroom of some sort. It was crowded with men, men getting up, shuffling about, pulling on clothes. He lay on the bottom-most of a tier of four narrow bunks. Through the interstices between the legs which crowded around him and moved past his face he could see other such tiers around the walls and away from the walls, stacked floor to ceiling and supported by stanchions.

Someone sat down on the foot of Wingate's bunk, crowding against Wingate's ankles while he drew on his socks. Wingate squirmed his feet away from the intrusion. The stranger turned his face toward him. "Did I crowdja, bud? Sorry." Then he added, not unkindly, "Better rustle out of there. The master at arms'll be riding you to get them bunks up." He yawned hugely and started to get up, quite evidently having dismissed Wingate and Wingate's affairs from his mind.

"Wait a minute!" Wingate demanded hastily.

"Huh?"

"Where am I? In jail?"

The stranger studied Wingate's bloodshot eyes and puffy, unwashed face with detached but unmalicious interest. "Boy, oh, boy, you must 'a' done a good job of drinking up your bounty money."

"Bounty money? What the hell are you talking about?"

"Honest to God, don't you know where you are?"

"No."

"Well—" The other seemed reluctant to proclaim a truth made silly by its self-evidence until Wingate's expression convinced him that

he really wanted to know. "Well, you're in the *Evening Star*, headed for Venus."

A COUPLE of minutes later the stranger touched him on the arm. "Don't take it so hard, bud. There's nothing to get excited about."

Wingate took his hands from his face and pressed them against his temples. "It's not real," he said, speaking more to himself than to the other. "It can't be real—"

"Stow it. Come and get your breakfast."

"I couldn't eat anything."

"Nuts. Know how you feel. Felt that way sometimes myself. Food is just the ticket." The master at arms settled the issue by coming up and prodding Wingate in the ribs with his truncheon.

"What d'yuh think this is—sick bay, or first class? Get those bunks hooked up."

"Easy, mate, easy," Wingate's new acquaintance conciliated. "Our pal's not himself this morning." As he spoke he dragged Wingate to his feet with one massive hand, then with the other shoved the tier of bunks up and against the wall. Hooks clicked into their sockets and the tier stayed up, flat to the wall.

"He'll be a damn sight less himself if he interferes with my routine," the petty officer predicted. But he moved on. Wingate stood barefooted on the floorplates, immobile and overcome by a feeling of helpless indecision which was reinforced by the fact that he was dressed only in his underwear. His champion studied him.

"You forgot your pillow. Here—"

He reached down into the pocket formed by the lowest bunk and the wall and hauled out a flat package covered with transparent plastic. He broke the seal and shook out the

contents, a single coverall garment of heavy denim. Wingate put it on gratefully. "You can get the squeezer to issue you a pair of slippers after breakfast," his friend added. "Right now we gotta eat."

The last of the queue had left the galley window by the time they reached it, and it was closed. Wingate's companion pounded on it. "Open up in there!"

It slammed open. "No seconds," a face announced.

The stranger prevented the descent of the window with his hand. "We don't want seconds, shipmate, we want firsts."

"Why the devil can't you show up on time?" the galley functionary grouched. But he slapped two ration cartons down on the broad sill of the issuing window. The big fellow handed one to Wingate, and sat down on the floorplates, his back supported by the galley bulkhead.

"What's your name, bud?" he inquired as he skinned the cover off his ration. "Mine's Hartley—Satchel Hartley."

"Mine is Humphrey Wingate."

"O. K., Hump. Pleased to meetcha. Now what's all this song and dance you been giving me?" He spooned up an impossible bite of baked eggs, and sucked coffee from the end of his carton.

"Well," said Wingate, his face twisted with worry, "I guess I've been shanghaied." He tried to emulate Hartley's method of drinking and got the brown liquid over his face.

"Here—that's no way to do," Hartley said hastily. "Put the nipple in your mouth, then don't squeeze any harder than you suck. Like this." He illustrated. "Your theory don't seem very sound to me. The company don't need crimps when there's plenty of guys standing in

line for a chance to sign up. What happened? Can't you remember?"

Wingate tried. "The last thing I recall," he said, "is arguing with a gyro driver over his fare."

Hartley nodded. "They'll gyp you every time. D'you think he put the slug on you?"

"Well—no, I guess not. I seem to be all right, except for the damndest hangover you can imagine."

"You'll feel better. You ought to be glad the *Evening Star* is a high-gravity ship instead of a trajectory job. Then you'd really be sick, and no foolin'."

"How's that?"

"I mean that she accelerates or decelerates her whole run. Have to, because she carries cabin passengers. If we had been sent by a freighter, it'd be a different story. They gun 'em into the right trajectory, then go weightless for the rest of the trip. Man, how the new chums do suffer!" He chuckled.

Wingate was in no condition to dwell on the hardships of space sickness. "What I can't figure out," he said, "is how I landed here. Do you suppose they could have brought me aboard by mistake, thinking I was somebody else?"

"Can't say. Say, aren't you going to finish your breakfast?"

"I've had all I want."

Hartley took his statement as an invitation and quickly finished off Wingate's ration. Then he stood up, crumpled the two cartons into a ball, stuffed them down a disposal chute, and said,

"What are you going to do about it?"

"What am I going to do about it?" A look of decision came over Wingate's face. "I'm going to march right straight up to the captain and demand an explanation, that's what I'm going to do!"

"I'd take that by easy stages, Hump," Hartley commented doubtfully.

"Easy stages, hell!" He stood up quickly. "Ow! My head!"

THE master at arms referred them to the chief master at arms in order to get rid of them. Hartley waited with Wingate outside the stateroom of the chief master at arms to keep him company. "Better sell 'em your bill of goods pretty pronto," he advised.

"Why?"

"We'll ground on the Moon in a few hours. The stop to refuel at Luna City for deep space will be your last chance to get out, unless you want to walk back."

"I hadn't thought of that," Wingate agreed delightedly. "I thought I'd have to make the round trip in any case."

"Shouldn't be surprised but what you could pick up the *Morning Star* in a week or two. If it's their mistake, they'll have to return you."

"I can beat that," said Wingate eagerly. "I'll go right straight to the bank at Luna City, have them arrange a letter of credit with my bank, and buy a ticket on the Earth-Moon shuttle."

Hartley's manner underwent a subtle change. He had never in his life "arranged a letter of credit." Perhaps such a man *could* walk up to the captain and lay down the law.

The chief master at arms listened to Wingate's story with obvious impatience and interrupted him in the middle of it to consult his roster of emigrants. He thumbed through it to the W's and pointed to a line. Wingate read it with a sinking feeling. There was his own name, correctly spelled. "Now get out," ordered the official, "and quit wasting my time."

But Wingate stood up to him. "You have no authority in this matter—none whatsoever. I insist that you take me to the captain."

"Why, you—"

Wingate thought momentarily that the man was going to strike him. He interrupted:

"Be careful what you do. You are apparently the victim of an honest mistake—but your legal position will be very shaky indeed if you disregard the requirements of space-wise law, under which this vessel is licensed. I don't think your captain would be pleased to have to explain such actions on your part in Federal court."

That he had gotten the man angry was evident. But a man does not get to be chief police officer of a major transport by jeopardizing his superior officers. His jaw muscles twitched, but he pressed a button, saying nothing. A junior master at arms appeared. "Take this man to the purser." He turned his back in dismissal and dialed a number on the ship's intercommunication system.

Wingate was let in to see the purser, ex-officio company business agent, after only a short wait. "What's this all about?" that officer demanded. "If you have a complaint, why can't you present it at the morning hearings in the regular order?"

Wingate explained his predicament as clearly, convincingly, and persuasively as he knew how. "And so you see," he concluded, "I want to be put aground at Luna City. I've no desire to cause the company any embarrassment over what was undoubtedly an unintentional mishap—particularly as I am forced to admit that I had been celebrating rather freely and, perhaps, in some manner, contributed to the mistake."

The purser, who had listened non-committally to his recital, made no answer. He shuffled through a high stack of file folders which rested on one corner of his desk, selected one and opened it. It contained a sheaf of legal-size papers clipped together at the top. These he studied leisurely for several minutes while Wingate stood waiting.

The purser breathed with an asthmatic noisiness while he read, and from time to time drummed on his bared teeth with his fingernails. Wingate had about decided, in his none-too-steady nervous condition, that if the man raised his hand to his mouth just once more, he, Wingate, would scream and start throwing things. At this point the purser chucked the dossier across the desk toward Wingate. "Better have a look at these," he said.

Wingate did so. The main exhibit he found to be a contract, duly entered into between Humphrey Wingate and the Venus Development Co. for six years of indentured labor on the planet Venus.

"THAT your signature?" asked the purser.

Wingate's professional caution stood him in good stead. He studied the signature closely in order to gain time while he tried to collect his wits. "Well," he said at last, "I will stipulate that it looks very much like my signature, but I will not concede that it is my signature. I'm not a handwriting expert."

The purser brushed aside the objection with an air of annoyance. "I haven't time to quibble with you. Let's check the thumb print. Here." He shoved an impression pad across his desk. For a moment Wingate considered standing on his legal rights by refusing, but no, that would prejudice his case. He had nothing

to lose; it *couldn't* be his thumb print on the contract. Unless—

But it was. Even his untrained eye could see that the two prints matched. He fought back a surge of panic. This was probably a nightmare, inspired by his argument last night with Jones. Or, if by some wild chance it were real, it was a frame-up in which he must find the flaw. Men of his sort were not framed; the whole thing was ridiculous. He marshaled his words carefully.

"I won't dispute your position, my dear sir. In some fashion both you and I have been made the victims of a rather sorry joke. It seems hardly necessary to point out that a man who is unconscious, as I must have been last night, may have his thumb print taken without his knowledge. Superficially, this contract is valid, and I assume, naturally, your good faith in the matter. But, in fact, the instrument lacks one necessary element of a contract."

"Which is?"

"The intention on the part of both parties to enter into a contractual relationship. Notwithstanding signature and thumb print, I had no intention of contracting, which can easily be shown by other factors. I am a successful lawyer with a good practice, as my tax returns will show. It is not reasonable to believe—and no court *will* believe—that I voluntarily gave up my accustomed life for six years of indenture at a much lower income."

"So you're a lawyer, eh? Perhaps there *has* been chicanery—on your part. How does it happen that you represent yourself here as a radio technician?" He pointed to the contract.

Wingate again had to steady himself at this unexpected flank attack. He was, in truth, a radio expert—it

was his cherished hobby—but how had they known? Shut up, he told himself. Don't admit anything. "The whole thing is ridiculous," he protested. "I insist that I be taken to see the captain. I can break that contract in ten minutes' time."

The purser waited before replying. "Are you through speaking your piece?"

"Yes."

"Very well. You've had your say, now I'll have mine. You listen to me, Mr. Spacelawyer. That contract was drawn up by some of the shrewdest legal minds in two planets. They had specifically in mind that worthless bums would sign it, drink up their bounty money, and then decide that they didn't want to go to work after all. That contract has been subjected to every sort of attack possible and revised so that it can't be broken by the devil himself.

"You're not peddling your curb-stone law to another stumblebum in this case; you are talking to a man who knows just where he stands legally. As for seeing the captain—if you think the commanding officer of a major vessel has nothing more to do than listen to the rhira dreams of a self-appointed word artist, you've got another think coming! Return to your quarters!"

Wingate started to speak, thought better of it, and turned to go. This would require some thought. The purser stopped him. "Wait. Here's your copy of the contract." He chucked it, the flimsy white sheets riffled to the deck. Wingate picked them up and left silently.

HARTLEY was waiting for him in the passageway. "How'dja make out, Hump?"

"Not so well. No, I don't want to talk about it. I've got to think."

They walked silently back the way

they had come toward the ladder which gave access to the lower decks. A figure ascended from the ladder and came toward them. Wingate noted it without interest.

He looked again. Suddenly the whole preposterous chain of events fell into place; he shouted in relief. "Sam!" he called out. "Sam—you cockeyed old so-and-so. I should have spotted your handiwork." It was all clear now; Sam had framed him with a phony shanghai. Probably the skipper was a pal of Sam's—a reserve officer, maybe—and they had cooked it up between them. It was a rough sort of joke, but he was too relieved to be angry. Just the same, he would make Jones pay for his fun somehow on the jump back from Luna City.

It was then that he noticed that Jones was not laughing.

Furthermore, he was dressed—most unreasonably—in the same blue denim that the contract laborers wore. "Hump," he was saying, "are you still drunk?"

"Me? No. What's the id—"

"Don't you realize we are in a jam?"

"Oh, hell, Sam, a joke's a joke, but don't keep it up any longer. I've caught on, I tell you. I don't mind. It was a good gag."

"Gag, eh?" said Jones bitterly. "I suppose it was just a gag when you talked me into signing up."

"I persuaded *you* to sign up?"

"You certainly did. You were so damn sure you knew what you were talking about. You claimed that we could sign up, spend a month or so on Venus, and come home. You wanted to bet on it. So we went around to the docks and signed up. It seemed like a good idea then—the only way to settle the argument."

Wingate whistled softly. "Well, I'll be— Sam, I haven't the slight-

est recollection of it. I must have drawn a blank before I passed out."

"Yeah, I guess so. Too bad you didn't pass out sooner. Not that I'm blaming you; you didn't drag me. Anyhow, I'm on my way up to try to straighten it out."

"Better wait a minute till you hear what happened to me. Oh, yes—Sam, this is . . . uh . . . Satchel Hartley. Good sort." Hartley had been waiting uncertainly near them; he stepped forward and shook hands.

Wingate brought Jones up to date and added, "So you see, your reception isn't likely to be too friendly.

I guess I muffed it. But we are sure to break the contract as soon as we can get a hearing on time alone."

"How do you mean?"

"We were signed up less than twelve hours before ship lifting. That's contrary to the Space Precautionary Act."

"Yes . . . yes, I see what you mean. The Moon's in her last quarter; they would lift the ship sometime after midnight to take advantage of favorable Earth swing. I wonder what time it was when we signed on?"

Wingate took out his contract



"Shanghaied!" he groaned. "My head—!"

copy. The notary's stamp showed a time of eleven thirty-two. "Great day!" he shouted. "I knew there would be a flaw in it somewhere. This contract is invalid on its face. The ship's log will prove it."

Jones studied it. "Look again," he said. Wingate did so. The stamp showed eleven thirty-two, but a. m., not p. m.

"But that's impossible," he protested.

"Of course it is. But it's official. I think we will find that the story is that we were signed on in the morning, paid our bounty money, and had one last glorious luau before we were carried aboard. I seem to recollect some trouble in getting the recruiter to sign us up. Maybe we convinced him by kicking in our bounty money."

"But we *didn't* sign up in the morning. It's not true, and I can prove it."

"Sure, you can prove it—but *how can you prove it without going back to Earth first!*"

"So YOU SEE it's this way," Jones decided after some minutes of somewhat fruitless discussion, "there is no sense in trying to break our contracts here and now; they'll laugh at us. The thing to do is to make money talk, and talk loud. The only way I can see to get us off at Luna City is to post nonperformance bonds with the company bank there—and damn big ones, too."

"How big?"

"Twenty thousand credits at least, I should guess."

"But that's not equitable—it's all out of proportion."

"Quit worrying about equity, will you? Can't you realize that they've got us where the hair is short? This won't be a bond set by a court ruling; it's got to be big enough to make

a minor company official take a chance on doing something that's not in the book."

"I can't raise such a bond."

"Don't worry about that. I'll take care of it."

Wingate wanted to argue the point, but did not. There are times when it is very convenient to have a wealthy friend.

"I've got to get a radiogram off to my sister," Jones went on, "to get this done—"

"Why your sister? Why not your family firm?"

"Because we need fast action, that's why. The lawyers that handle our family finances would fiddle and fume around trying to confirm the message. They'd send a message back to the captain asking if Sam Houston Jones were really aboard, and he would answer 'no,' as I'm stamped in as Sam Jones. I had some silly idea of staying out of the news broadcasts on account of the family."

"You can't blame them," protested Wingate, feeling an obscure clannish loyalty to his colleagues in law; "they're handling other peoples' money."

"I'm not blaming them. But I've got to have fast action, and sis'll do what I ask her. I'll phrase the message so she'll know it's me. The only hurdle now is to persuade the purser to let me send a message on tick."

He was gone for a long time on this mission. Hartley waited with Wingate, both to keep him company and because of a strong human interest in unusual events. When Jones finally appeared he wore a look of tight-lipped annoyance. Wingate, seeing the expression, felt a sudden, chilling apprehension. "Couldn't you send it? Wouldn't he let you?"

"Oh, he let me—finally," Jones ad-

mitted, "but that purser—man, is he tight!"

Even without the alarm gongs, Wingate would have been acutely aware of the grounding at Luna City. The sudden change from the high gravity deceleration of their approach to the weak surface gravity—one-sixth Earth normal—of the Moon, took immediate toll on his abused stomach. It was well that he had not eaten much. Both Hartley and Jones were deep-space men and regarded enough acceleration to permit normal swallowing as adequate for any purpose. There is a curious lack of sympathy between those who are subject to space sickness and those who are immune to it. Why the spectacle of a man regurgitating, choked, eyes streaming with tears, stomach knotted with pain, should seem funny is difficult to see, but there it is. It divides the human race into two distinct and antipathetic groups—amused contempt on one side; helpless, murderous hatred on the other.

Neither Hartley nor Jones had the inherent sadism which is too frequently evident on such occasions—for example, the great wit who suggests salt pork as a remedy—but, feeling no discomfort themselves, they were simply unable to comprehend—having forgotten the soul-twisting intensity of their own experience as new chums—that Wingate was literally suffering "a fate worse than death"—much worse, for it was stretched into a sensible eternity by a distortion of the time sense known only to sufferers from space sicknesses, seasicknesses, and—we are told—smokers of hashish.

As a matter of fact, the stop on the Moon was less than four hours long. Toward the end of the wait, Wingate had quieted down sufficiently again to take an interest in

the expected reply to Jones' message, particularly after Jones had assured him that he would be able to spend the expected lay-over under bond at Luna City in a hotel equipped with a centrifuge.

But the answer was delayed. Jones had expected to hear from his sister within an hour, perhaps before the *Evening Star* grounded at the Luna City docks. As the hours stretched out he managed to make himself very unpopular at the radio room by his repeated inquiries. An overworked clerk had sent him brusquely about his business for the seventeenth time when he heard the alarm sound preparatory to raising ship; he went back and admitted to Wingate that his scheme had apparently failed.

"Of course, we've got ten minutes yet," he finished unhopefully. "If the message should arrive before they raise ship, the captain could still put us aground at the last minute. We'll go back and haunt 'em some more right up to the last. But it looks like a thin chance."

"Ten minutes," said Wingate. "Couldn't we manage somehow to slip outside and run for it?"

Jones looked exasperated. "Have you ever tried running in a total vacuum?"

WINGATE had very little time in which to fret on the passage from Luna City to Venus. He learned a great deal about the care and cleaning of washrooms, and spent ten hours a day perfecting his new skill. Masters at arms have long memories.

The *Evening Star* passed beyond the limits of ship-to-Terra radio communication shortly after leaving Luna City; there was nothing to do but wait until arrival at Adonis, port of the North Polar colony. The company radio there was strong enough

to remain in communication at all times except for the sixty days bracketing superior conjunction and a shorter period of solar interference at inferior conjunction.

"They will probably be waiting for us with a release order when we ground," Jones assured Wingate, "and we'll go back on the return trip of the *Evening Star*—first-class this time. Or, at the very worst, we'll have to wait over for the *Morning Star*. That wouldn't be so bad, once I get some credit transferred; we could spend it at Venusburg."

"I suppose you went there on your cruise," Wingate said, curiosity showing in his voice. He was no Sybarite, but the lurid reputation of the most infamous, or famous—depending on one's evaluations—pleasure city of three planets was enough to stir the imagination of the least hedonistic.

"No—worse luck!" Jones denied. "I was on a hull-inspection board the whole time. Some of my messmates went, though—boy!" He whistled softly and shook his head.

But there was no one awaiting their arrival, nor was there any message. Again they stood around the communication office until told sharply and officially to get on back to their quarters and stand by to disembark, "—and be quick about it!"

"I'll see you in the receiving barracks, Hump," were Jones' last words before he hurried off to his own compartment.

The master at arms responsible for the compartment in which Hartley and Wingate were billeted lined his charges up in a rough column of twos and, when ordered to do so by the metallic bray of the ship's loudspeaker, led them through the central passageway and down four decks to the lower passenger port. It stood open; they shuffled through the lock

and out of the ship—not into the free air of Venus, but into a sheet-metal tunnel which joined it, after some fifty yards, to a building.

The air within the tunnel was still acrid from the atomized antiseptic with which it had been flushed out, but to Wingate it was nevertheless fresh and stimulating after the stale flatness of the repeatedly reconditioned air of the transport. That, plus the surface gravity of Venus, five sixths of Earth normal, strong enough to prevent nausea, yet low enough to produce a feeling of lightness and strength—these things combined to give him an irrational optimism, an up-and-at-'em frame of mind.

The exit from the tunnel gave into a moderately large room, windowless but brilliantly and glarelessly lighted from concealed sources. It contained no furniture.

"Squa-a-ad—halt!" called out the master at arms, and handed papers to a slight, clerkish-appearing man who stood near an inner doorway. The man glanced at the papers, counted the detachment, then signed one sheet, which he handed back to the ship's petty officer, who accepted it and returned through the tunnel.

The clerkish man turned to the immigrants. He was dressed, Wingate noted, in nothing but the briefest of shorts, hardly more than a strap, and his entire body, even his feet, was a smooth, mellow tan. "Now, men," he said in a mild voice, "strip off your clothes and put them in the hopper." He indicated a fixture set in one wall.

"Why?" asked Wingate. His manner was uncontentious, but he made no move to comply.

"Come, now," he was answered, still mildly, but with a note of annoyance, "don't argue. It's for your own protection. We can't afford to import disease."

Wingate checked a reply and unzipped his coverall. Several who had paused to hear the outcome followed his example. Suits, shoes, underclothing, socks, they all went into the hopper.

"Follow me," said their guide.

In the next room the naked herd were confronted by four "barbers" armed with electric clippers and latex gloves who proceeded to clip them smooth. Again Wingate felt disposed to argue, but decided the issue was not worth it. But he wondered if the female labor clients were required to submit to such drastic quarantine precautions. It would be a shame, it seemed to him, to sacrifice a beautiful head of hair that had been twenty years in growing.

The succeeding room was a shower room. A curtain of warm spray completely blocked passage through the room. Wingate entered it reluctantly, even eagerly, and fairly wallowed in the first decent bath he had been able to take since leaving Earth. They were plentifully supplied with liquid green soap, strong and smelly, but which lathered freely. Half a dozen attendants, dressed as skimpily as their guide, stood on the far side of the wall of water and saw to it that the squad remained under the shower a fixed time and scrubbed. In some cases they made highly personal suggestions to insure thoroughness. Each of them wore a red cross on a white field affixed to his belt which lent justification to their officiousness.

Blasts of warm air in the exit passageway dried them quickly and completely.

"Hold still."

Wingate complied. The bored hospital orderly who had spoken dabbed at Wingate's upper arm with a swab

which felt cold to touch, then scratched the spot.

"That's all, move on."

Wingate added himself to the queue at the next table. The experience was repeated on the other arm. By the time he had worked down to the far end of the room the outer sides of each arm were covered with little red scratches, more than twenty of them.

"What's this all about?" he asked the hospital clerk at the end of the line, who had counted his scratches and checked his name off a list.

"Skin tests—to check your resistances and immunities."

"Resistance to what?"

"Anything. Both terrestrial and Venusian diseases. Fungoids, the Venus ones are, mostly. Move on, you're holding up the line."

He heard more about it later. It took from two to three weeks to recondition the ordinary terrestrial to Venus conditions. Until that reconditioning was complete and immunity was established to the new hazards of another planet it was literally death to an earthman to expose his skin and particularly his mucous membranes to the ravenous invisible parasites of the surface of Venus.

The ceaseless fight of life against life which is the dominant characteristic of life anywhere proceeds with especial intensity, under conditions of high metabolism, in the steamy jungles of Venus. The general bacteriophage which has so nearly eliminated disease caused by pathogenic micro-organisms on Earth was found capable of a subtle modification which made it potent against the analogous but different diseases of Venus. The hungry fungi were another matter.

Imagine the worst of the fungoid-type skin diseases you have ever encountered—ringworm, dhobie itch,

athlete's foot, Chinese rot, salt-water itch, seven-year itch. Add to that your conception of mold, of damp rot, of scale, of toadstools feeding on decay. Then conceive them speeded up in their processes, visibly crawling as you watch—picture them attacking your eyeballs, your armpits, the soft wet tissues inside your mouth, working down into your lungs.

The first Venus expedition was lost entirely. The second had a surgeon with sufficient imagination to provide what seemed a liberal supply of salicylic acid and mercury salicylate as well as a small ultraviolet radiator. Three of them returned.

But permanent colonization depends on adaptation to environment, not insulating against it. Lima City might be cited as a case which denies this proposition, but it is only superficially so. While it is true that the "lunatics" are absolutely dependent on their city-wide hermetically-sealed air bubble, Luna City is not a self-sustaining colony; it is an outpost, useful as a mining station, as an observatory, as a refueling stop beyond the densest portion of Terra's gravitational field.

Venus is a colony. The colonists breathe the air of Venus, eat its food, and expose their skins to its climate and natural hazards. Only the cold polar regions—approximately the equivalent in weather conditions to an Amazonian jungle on a hot day in the rainy season—are tenable by terrestrials, but here they slop barefooted on the marshy soil in a true ecological balance.

WINGATE ATE the meal that was offered to him—satisfactory but roughly served and dull, except for Venus sweet-sour melon. The portion which he ate would have fetched a price in a Chicago gourmets' res-

taurant equivalent to the food budget for a week of a middle-class family. Later he located his assigned sleeping billet. Thereafter he attempted to locate Sam Houston Jones. He could find no sign of him among the other labor clients, nor anyone who remembered having seen him. He was advised by one of the permanent staff of the conditioning station to inquire of the factor's clerk. This he did, in the ingratiating manner he had learned it was wise to use in dealing with minor functionaries.

"Come back in the morning. The lists will be posted."

"Thank you, sir. Sorry to have bothered you, but I can't find him, and I was afraid he might have taken sick or something. Could you tell me if he is on the sick list?"

"Oh, well— Wait a minute." The clerk thumbed through his records. "Hm-m-m—you say he was in the *Evening Star*?"

"Yes, sir."

"Well, he's not. M-m-m, no—oh, yes, here he is. He didn't disembark here."

"What did you say?"

"He went on with the *Evening Star* to New Auckland, South Pole. He's stamped in as a machinist's helper. If you had told me that I'd 'a' known. All the metal workers in this consignment were sent to work on the new South Power Station."

After a moment Wingate pulled himself together enough to murmur, "Thanks for your trouble."

" 'Sall right. Don't mention it." The clerk turned away.

SOUTH POLE COLONY! He muttered it to himself. South Pole Colony—his only friend twelve thousand miles away. At last Wingate felt alone, alone and trapped, abandoned. During the short interval

between waking up aboard the transport and finding Jones also aboard he had not had time fully to appreciate his predicament, nor had he, then, lost his upper-class arrogance, the innate conviction that it could not be serious—such things just don't happen to people; not to people one *knows*!

But in the meantime he had suffered such assaults to his human dignity—the chief master at arms had seen to some of it—that he was no longer certain of his essential inviolability from unjust or arbitrary treatment. But now, shaved and bathed without his consent, stripped of his clothing and attired in a harnesslike breechclout, transported millions of miles from his social matrix, subject to the orders of persons indifferent to his feelings and who claimed legal control over his person and actions, and now, most bitterly, cut off from the one human contact which had given him support and courage and hope, he realized at last with chilling thoroughness that anything could happen to him, to *him*, Humphrey Belmont Wingate, successful attorney at law and member of all the right clubs.

"WINGATE!"

"That's you, Jack. Go on in—don't keep them waiting."

Wingate pushed through the doorway and found himself in a fairly crowded room. Thirty-odd men were seated around the sides of the room. Near the door a clerk sat at a desk, busy with papers. One brisk-mannered individual stood in the cleared space between the chairs near a low platform on which all the illumination of the room was concentrated.

The clerk at the door looked up to say, "Step up where they can see you." He pointed a stylus at the platform.

Wingate moved forward and did as he was bade, blinking at the brilliant light.

"Contract No. 482-23-06," read the clerk, "client Humphrey Wingate, six years, radio technician non-certified, pay grade six-D, contract now available for assignment."

Three weeks it had taken them to condition him, three weeks with no word from Jones. He had passed his exposure test without infection; he was about to enter the active period of his indenture.

The brisk man spoke up close on the last words of the clerk:

"Now here, patrons, if you please—we have an exceptionally promising man. I hardly dare tell you the ratings he received on his intelligence, adaptability, and general-information tests. In fact, I won't, except to tell you that administration has put in a protective offer of a thousand credits. But it would be a shame to use any such client for the routine work of administration when we need good men so badly to wrest wealth from the wilderness. I venture to predict that the lucky bidder who obtains the services of this client will be using him as a foreman within a month. But look him over for yourselves, talk to him, and see for yourselves."

The clerk whispered something to the speaker. He nodded and added, "I am required to notify you, gentlemen and patrons, that this client has given the usual legal notice of two weeks, subject, of course, to liens of record." He laughed jovially and cocked one eyebrow as if there were some huge joke behind his remarks. No one paid attention to the announcement; to a limited extent, Wingate appreciated wryly the nature of the jest. He had given notice the day after he discovered that

Jones had been sent to South Pole Colony, and had found that while he was free theoretically to quit, it was freedom to starve on Venus, unless he first worked out his bounty and his passage both ways.

Several of the patrons gathered around the platform and looked him over, discussing him as they did so. "Not too well muscled." "I'm not overeager to bid on these smart boys; they're trouble makers." "No, but a stupid client isn't worth his keep." "What can he *do*? I'm going to have a look at his record." They drifted over to the clerk's desk and scrutinized the results of the many tests and examinations that Wingate had undergone during his period of quarantine. All but one beady-eyed individual who sidled up closer to Wingate, and, resting one foot on the platform so that he could bring his face nearer, spoke in confidential tones:

"I'm not interested in those phony puff sheets, bub. Tell me about yourself."

"There's not much to tell."

"Loosen up. You'll like my place. Just like a home—I run a free crock to Venusburg for my boys. Had any experience handling niggers?"

"No."

"Well, the natives ain't niggers, anyhow, except in a manner of speaking. You look like you could boss a gang. Had any experience?"

"Not much."

"Well—maybe you're modest. I like a man who keeps his mouth shut. And my boys like me. I never let my pusher take kick-backs."

"No," put in another patron who had returned to the side of the platform, "you save that for yourself, Rigsbee."

"You stay out o' this, Van Huyen!"

THE NEWCOMER, a heavy-set, middle-aged man, ignored the other and addressed Wingate himself. "You have given notice. Why?"

"The whole thing was a mistake. I was drunk."

"Will you do honest work in the meantime?"

Wingate considered this. "Yes," he said finally. The heavy-set man nodded and walked heavily back to his chair, settling his broad girth with care and giving his harness a hitch.

When the others were seated the spokesman announced cheerfully, "Now, gentlemen, if you are quite through— Let's hear an opening offer for this contract. I wish I could afford to bid him in as my assistant—by George, I do! Now—do I hear an offer?"

"Six hundred."

"Please, patrons! Did you not hear me mention a protection of one thousand?"

"I don't think you mean it. He's a sleeper."

The company agent raised his eyebrows. "I'm sorry. I'll have to ask the client to step down from the platform."

But before Wingate could do so, another voice said, "One thousand."

"Now that's better!" exclaimed the agent. "I should have known that you gentlemen wouldn't let a real opportunity escape you. But a ship can't fly on one jet. Do I hear eleven hundred? Come, patrons, you can't make your fortunes without clients. Do I hear—"

"Eleven hundred."

"Eleven hundred from Patron Rigsbee! And a bargain it would be at that price. But I doubt if you will get it. Do I hear twelve?"

The heavy-set man flicked a thumb upward. "Twelve hundred from Patron van Huyen. I see I've

made a mistake and am wasting your time; the intervals should be not less than two hundred. Do I hear fourteen? Do I hear fourteen? Going once for twelve. Going twi—"

"Fourteen," Rigsbee said sullenly.

"Seventeen," Van Huysen added at once.

"Eighteen," snapped Rigsbee.

"No-o-o," said the agent, "no interval of less than two, please."

"All right, dammit, nineteen!"

"Nineteen I hear. It's a hard number to write; who'll make it twenty-one?" Van Huysen's thumb flicked again. "Twenty-one it is. It takes money to make money. What do I hear? What do I hear?" He paused. "Going once for twenty-one. Going twice for twenty-one. Are you giving up so easily, Patron Rigsbee?"

"Van Huysen is a—" The rest was muttered too indistinctly to hear.

"One more chance, gentlemen. Going, going—gone!" He smacked his palms sharply together. "Sold to Patron van Huysen for twenty-one hundred credits. My congratulations, sir, on a shrewd deal."

Wingate followed his new master out the far door. They were stopped in the passageway by Rigsbee. "All right, Van, you've had your fun. I'll cut your losses for two thousand."

"Out of my way."

"Don't be a fool. He's no bargain. You don't know how to sweat a man—I do."

Van Huysen ignored him, pushing on past. Wingate followed him out into warm winter drizzle to the parking lot, where steel crocodiles were drawn up in parallel rows. Van Huysen paused beside a thirty-foot Remington. "Get in."

THE LONG boxlike body of the crock was stowed to its load line with supplies Van Huysen had pur-

chased at the base. Sprawled on the tarpaulin which covered the cargo were half a dozen men. One of them stirred as Wingate climbed over the side. "Hump! Oh, Hump!"

It was Hartley. Wingate was surprised at his own surge of emotion. He gripped Hartley's hand and exchanged friendly insults.

"Chums," said Hartley, "meet Hump Wingate. He's a right guy. Hump, meet the gang. That's Jimmie right behind you. He rassles this velocipede."

The man designated gave Wingate a bright nod and moved forward into the operator's seat. At a wave from Van Huysen, who had seated his bulk in the little sheltered cabin aft, he pulled back on both control levers and the crocodile crawled away, its caterpillar treads clanking and chunking through the mud.

Three of the six were old-timers, including Jimmie, the driver. They had come along to handle cargo, the ranch products which the patron had brought in to market and the supplies he had purchased to take back. Van Huysen had bought the contracts of two other clients in addition to Wingate and Satchel Hartley. Wingate recognized them as men he had known casually in the *Evening Star* and at the assignment and conditioning station. They looked a little woebegone, which Wingate could thoroughly understand, but the men from the ranch seemed to be enjoying themselves. They appeared to regard the opportunity to ride a load to and from town as an outing. They sprawled on the tarpaulin and passed the time gossiping and getting acquainted with the new chums.

But they asked no personal questions. No labor client on Venus ever asked Wingate anything about what he had been before he shipped with

the company unless he first volunteered information. It "wasn't done."

Shortly after leaving the outskirts of Adonis, the car slithered down a sloping piece of ground, teetered over a low bank, and splashed loggily into water. Van Huysen threw up a window in the bulkhead which separated the cabin from the hold and shouted, "Dumkopf! How many times do I tell you to take those launchings slowly?"

"Sorry, boss," Jimmie answered, "I missed it."

"You keep your eyes peeled or I get me a new crocker!" He slammed the port.

Jimmie glanced around and gave the other clients a sly wink. He had his hands full; the marsh they were traversing looked like solid ground, so heavily was it overgrown with rank vegetation. The crocodile now functioned as a boat, the broad flanges of the treads acting as paddle wheels. The wedge-shaped prow pushed shrubs and marsh grass aside, or struck and ground down small trees. Occasionally the lugs would bite into the mud of a shoal bottom, and, crawling over a bar, return temporarily to the status of a land vehicle. Jimmie's slender, nervous hands moved constantly over the controls, avoiding large trees and continually seeking the easiest, most nearly direct route, while he split his attention between the terrain and the craft's compass.

Presently the conversation lagged and one of the ranch hands started to sing. He had a passable tenor voice and was soon joined by others. Wingate found himself singing the choruses as fast as he learned them. They sang "Pay Book" and "Since the Pusher Met My Cousin," and a mournful thing called "They Found Him in the Bush." But this was fol-

lowed by a light number, "The Night the Rain Stopped," which seemed to have an endless string of verses recounting various unlikely happenings which occurred on that occasion.

Jimmie drew applause and enthusiastic support in the choruses with a ditty entitled "That Red-headed Venusburg Girl," but Wingate considered it inexcusably vulgar. He did not have time to dwell on the matter; it was followed by a song which drove it out of his mind.

The tenor started it, slowly and softly. The others sang the refrains while he rested—all but Wingate; he was silent and thoughtful throughout. In the triplet of the second verse the tenor dropped out and the others sang in his place.

*Oh, you stamp your paper and you sign  
your name,  
(Come away! Come away!)*  
*They pay your bounty and you drown your  
shame.  
(Rue the day! Rue the day!)*  
*They land you down at Ellis Isle and put  
you in a pen;  
There you see what happens to the six-year  
men—  
They haven't paid their bounty and they  
sign 'em up again!  
(Here to stay! Here to stay!)*  
*But me I'll save my bounty and a ticket  
on the ship,  
(So you say! So you say!)*  
*And then you'll see me leavin' on the very  
next trip.  
(Come the day! Come the day!)*  
*Oh, we've heard that kinda story just a  
thousand times and one.  
Now we wouldn't say you're lyin' but we'd  
like to see it done.  
We'll see you next at Venusburg a-payin'  
for your fun!  
(Spoken slowly) And you'll never meet  
your bounty on this hitch!  
(Come away!)*

It left Wingate with a feeling of depression not entirely accounted for by the tepid drizzle, the unappetizing landscape, nor by the blanket of

pale mist which is the invariable Venusian substitute for the open sky. He withdrew to one corner of the hold and kept to himself until, much later, Jimmie shouted, "Lights ahead!"

Wingate leaned out and peered eagerly toward his new home.

FOUR WEEKS and no word from Sam Houston Jones. Venus had turned once on its axis, the fortnight long Venusian "winter" had given way to an equally short "summer"—indistinguishable from "winter" except that the rain was a trifle heavier and a little hotter—and now it was "winter" again. Van Huysen's ranch, being near the pole, was, like most of the tenable area of Venus, never in darkness. The miles-thick, ever-present layer of clouds tempered the light of the low-hanging sun during the long day, and, equally, held the heat and diffused the light from a sun just below the horizon to produce a continuing twilight during the two-week periods which were officially "night" or "winter."

Four weeks and no word. Four weeks and no sun, no moon, no stars, no dawn. No clean, crisp breath of morning air, no life-quickening beat of noonday sun, no welcome evening shadows, nothing, nothing at all to distinguish one sultry, sticky hour from the next but the treadmill routine of sleep and work and food and sleep again—nothing but the gathering ache in his heart for the cool, blue skies of Terra.

He had acceded to the invariable custom that new men should provide a celebration for the other clients and had signed the squeezer's clits to obtain happy water—rhira—for the purpose—to discover, when first he signed the pay book, that his gesture of fellowship had cost him an-

other four months of delay before he could legally quit his "job." Thereupon he had resolved never again to sign a chit, had foresworn the prospect of brief holidays at Venusburg, had promised himself to save every possible credit against his bounty and transportation liens.

Whereupon he discovered that the mild alcoholoid drink was neither a vice nor a luxury, but a necessity, as necessary to human life on Venus as the ultraviolet factor present in all colonial illuminating systems. It produces not drunkenness, but lightness of heart, freedom from worry, and without it he could not *get to sleep*. Three nights of self-recrimination and fretting, three days of fatigue-drugged uselessness under the unfriendly eye of the pusher, and he had signed for his bottle with the rest, even though dully aware that the price of the bottle had washed out more than half of the day's microscopic progress toward freedom.

Nor had he been assigned to radio operation. Van Huysen had an operator; Wingate, although listed on the books as stand-by operator, went to the swamps with the rest. He discovered on rereading his contract a clause which permitted his patron to do this, and he admitted with half his mind—the detached judicial and legalistic half—that the clause was reasonable and proper, not inequitable or unjust.

WINGATE went to the swamps. He learned to wheedle and bully the little, mild amphibian people into harvesting the bulbous underwater growth of *Hyacinthus Veneris Johnsoni*—Venus swamproot—and bribe the co-operation of their matriarchs with promises of bonuses in the form of thigarek, a term which meant not only cigarette, but tobacco in any form, the staple medium in trade

when dealing with the natives.

He took his turn in the chopping sheds and learned, clumsily and slowly, to cut and strip the spongy outer husk from the pea-sized kernel which alone had commercial value and which must be removed intact, without scratch or bruise. The juice from the pods made his hands raw, and the odor made him cough and stung his eyes, but he enjoyed it more than the work in the marshes, for it threw him into the company of the female labor clients. Women were quicker at the work than men, and their smaller fingers more dexterous in removing the valuable, easily damaged capsule. Men were used for such work only when accumulated crops required extra help.

He learned his new trade from a motherly old person whom the other women addressed as Hazel. She talked as she worked, her gnarled old hands moving steadily and without apparent direction or skill. He could close his eyes and imagine that he was back on Earth and a boy again, hanging around his grandmother's kitchen while she shelled peas and rambled on.

"Don't you fret yourself, boy," Hazel told him. "Do your work and shame the devil. There's a great day coming."

"What kind of a great day, Hazel?"

"The day when the angels of the Lord will rise up and smite the powers of evil. The day when the prince of darkness will be cast down into the pit and the Prophet shall reign over the children of heaven. So don't you worry; it doesn't matter whether you are here or back home when the great day comes; the only thing that matters is your state of grace."

"Are you sure we will live long enough to see the day?"

She glanced around, then leaned over confidentially. "The day is almost upon us. Even now the Prophet moves up and down the land gathering his forces. Out of the clean farm country of the Mississippi Valley there comes the man, known in this world"—she lowered her voice still more—"as *Nehemiah Scudder!*"

Wingate hoped that his start of surprise and amusement did not show externally. He recalled the name. It was that of a pipsqueak, back-woods evangelist, an unimportant nuisance back on Earth, the butt of an occasional guying news story, but a man of no possible consequence.

The chopping shed pusher moved up to their bench. "Keep your eyes on your work, you! You're way behind now." Wingate hastened to comply, but Hazel came to his aid.

"You leave him be, Joe Thompson. It takes time to learn chopping."

"O. K., Mom," answered the pusher with a grin, "but keep him pluggin'. See?"

"I will. You worry about the rest of the shed. This bench'll have its quota." Wingate had been docked two days running for spoilage. Hazel was lending him poundage now and the pusher knew it, but everybody liked her, even pushers, who are reputed to like no one, not even themselves.

WINGATE STOOD just outside the gate of the bachelors' compound. There was yet fifteen minutes before lock-up roll call; he had walked out in a subconscious attempt to rid himself of the pervading feeling of claustrophobia which he had had throughout his stay. The attempt

was futile; there was no "outdoor-ness" about the outdoors on Venus—the bush crowded the clearing in on itself, the leaden, misty sky pressed down on his head, and the steamy heat sat on his bare chest. Still, it was better than the bunkroom in spite of its dehydrators.

He had not yet obtained his evening ration of rhira and felt, consequently, nervous and despondent, yet residual self-respect caused him to cherish a few minutes' clear thinking before he gave in to the cheerful soporific.

It's getting me, he thought; in a few more months I'll be taking every chance to get to Venusburg, or, worse yet, signing a chit for married quarters and condemning myself and my kids to a life sentence.

When he first arrived, the women clients, with their uniformly dull minds and usually commonplace faces, had seemed entirely unattractive. Now, he realized with dismay, he was no longer so fussy. Why, he was even beginning to lisp, as the other clients did, in unconscious imitation of the amphibians.

Early, he had observed that the clients could be divided roughly into two categories, the children of nature and the broken men. The first were those of little imagination and simple standards. In all probability they had known nothing better back on Earth; they saw in the colonial culture not slavery, but freedom from responsibility, security, and an occasional spree. The others were the broken men, the outcasts, they who had once been somebody, but, through some defect of character, or some accident, had lost their place in society. Perhaps the judge had said, "Sentence suspended if you ship for the colonies."

He realized with sudden panic that his own status was crystalliz-

ing; he was becoming one of the broken men. His background on Earth was becoming dim in his mind; he had put off for the last three days the labor of writing another letter to Jones; he had spent the last shift rationalizing the necessity for taking a couple of days' holiday at Venusburg.

Face it, son; face it, he told himself. You're slipping, you're letting your mind relax into slave psychology. You've unloaded the problem of getting out of this mess onto Jones—how do you know he *can* help you? For all you know, he may be dead. Out of the dimness of his memory he recaptured a phrase which he had read somewhere, some philosopher of history: "No slave is ever freed, *save he free himself.*"

All right, all right—pull up your socks, old son. Take a brace. No more rhira—no, that wasn't practical; a man had to have sleep. Very well, then, no rhira until lights out, keep your mind clear in the evenings and *plan*. Keep your eyes open, find out all you *can*, cultivate friendships, and watch for a chance.

THROUGH THE GLOOM he saw a human figure approaching the gate of the compound. As it approached he saw that it was a woman and supposed it to be one of the female clients. She came closer; he saw that he was mistaken. It was Annek van Huysen, daughter of the patron.

She was a husky, overgrown blond girl with unhappy eyes. He had seen her many times, watching the clients as they returned from their labor, or wandering alone around the ranch clearing. She was neither unsightly, nor in anywise attractive; her heavy, adolescent figure needed more to flatter it than the harness which all colonists wore as the maximum tolerable garment.

She stopped before him and, unzipping the pouch at her waist which served in lieu of pockets, took out a package of cigarettes. "I found this back there. Did you lose it?"

He knew that she lied; she had picked up nothing since she had come into sight. And the brand was one smoked on Earth and by patrons—no client could afford such. What was she up to?

He noted the eagerness in her face and the rapidity of her breathing, and realized, with confusion, that this girl was trying indirectly to make him a present. Why?

Wingate was not particularly conceited about his own physical beauty or charm, nor had he any reason to be. But what he had not realized was that among the common run of the clients he stood out like a cock pheasant in a barnyard. But that Annek found him pleasing he was forced to admit; there could be no other explanation for her trumped-up story and her pathetic little present.

His first impulse was to snub her. He wanted nothing of her, and resented the invasion of his privacy; and he was vaguely aware that the situation could be awkward, even dangerous, to him, involving, as it did, violations of custom which jeopardized the whole social and economic structure. From the viewpoint of the patrons, labor clients were almost as much beyond the pale as the amphibians. A liaison between a labor client and one of the womenfolk of the patrons could easily wake up old Judge Lynch.

But he had not the heart to be brusque with her. He could see the dumb adoration in her eyes; it would have required cold heartlessness to have repulsed her. Besides, there was nothing coy or provocative in her attitude; her manner was naïve,

almost childlike in its unsophistication. He recalled his determination to make friends; here was friendship offered, a dangerous friendship, but one which might prove useful in winning free.

He felt a momentary wave of shame that he should be weighing the potential usefulness of this defenseless child, but he suppressed it by affirming to himself that he would do her no harm; and, anyhow, there was the old saw about the vindictiveness of a woman scorned.

"Why, perhaps I did lose it," he evaded, then added, "It's my favorite brand."

"Is it?" she said happily. "Then do take it, in any case."

"Thank you. Will you smoke one with me? No, I guess that wouldn't do; your father would not want you to stay here that long."

"Oh, he's busy with his accounts. I saw that before I came out," she answered, and seemed unaware that she had given away her pitiful little deception. "But go ahead, I . . . I hardly ever smoke."

"Perhaps you prefer a meer-schaum pipe, like your father."

She laughed more than the poor witticism deserved. After that they talked aimlessly, both agreeing that the crop was coming in nicely, that the weather seemed a little cooler than last week, and that there was nothing like a little fresh air after supper.

"Do you ever walk for exercise after supper?" she asked.

He did not say that a long day in the swamps offered more than enough exercise, but agreed that he did.

"So do I," she blurted out. "Lots of times up near the water tower."

He looked at her. "Is that so? I'll remember that." The signal for roll call gave him a welcome excuse

to get away; three more minutes, he thought, and I would have had to make a date with her.

WINGATE FOUND himself called for swamp work the next day, the rush in the chopping sheds having abated. The crock lumbered and splashed its way around the long, meandering circuit, leaving one or more Earthmen at each supervision station. The car was down to four occupants, Wingate, Satchel, the pusher, and Jimmie the crocker, when the pusher signaled for another stop. The flat, bright-eyed heads of amphibian natives broke water on three sides as soon as they were halted.

"All right, Satchel," ordered the pusher, "this is your billet. Over the side."

Satchel looked around. "Where's my skiff?" The ranchers used small flat-bottomed duralumin skiffs in which to collect their day's harvest. There was not one left in the crock.

"You won't need one. You're goin' to clean this field for planting."

"That's O. K. Still, I don't see nobody around, *and* I don't see no solid ground."

The skiffs had a double purpose; if a man were working out of contact with other Earthmen and at some distance from safe dry ground, the skiff became his lifeboat. If the crocodile which was supposed to collect him broke down, or if for any other reason he had need to sit down or lie down while on station, the skiff gave him a place to do so. The older clients told grim stories of men who had stood in eighteen inches of water for twenty-four, forty-eight, seventy-two hours, and then drowned horribly, out of their heads from sheer fatigue.

"There's dry ground right over there." The pusher waved his hand in the general direction of a clump

of trees which lay perhaps a quarter of a mile away.

"Maybe so," answered Satchel equably. "Let's go see." He glanced at Jimmie, who turned to the pusher for instructions.

"Damnation! Don't argue with me! Get over the side!"

"Not," said Satchel, "until I've seen something better than two feet of slime to squat on in a pinch."

The little water people had been following the argument with acute interest. They clucked and lisped in their own language; those who knew some pidgin English appeared to be giving newsy and undoubtedly distorted explanations of the events to their less sophisticated brethren. Fuming as he was, this seemed to add to the pusher's anger.

"For the last time—get out there!"

"Well," said Satchel, settling his gross frame more comfortably on the floorplates, "I'm glad we've finished with that subject."

Wingate was behind the pusher. This circumstance probably saved Satchel Hartley at least a scalp wound, for he caught the arm of the pusher as he struck. Hartley closed in at once; the three wrestled for a few seconds on the bottom of the craft.

Hartley sat on the pusher's chest while Wingate pried a blackjack away from the clenched fingers of the pusher's right fist.

"Glad you saw him reach for that, Hump," Satchel acknowledged, "or I'd be needin' an aspirin about now."

"Yeah, I guess so," Wingate answered, and threw the weapon as far as he could out into the marshy waste. Several of the amphibians streaked after it and dived. "I guess you can let him up now."

The pusher said nothing to them as he brushed himself off, but he turned to the crocker, who had re-

mained quietly in his saddle at the controls the whole time. "Why the hell didn't you help me?"

"I supposed you could take care of yourself, boss," Jimmie answered noncommittally.

WINGATE and Hartley finished that work period as helpers to labor clients already stationed. The pusher had completely ignored them except for curt orders necessary to station them. But while they were washing up for supper back at the compound they received word to report to the big house.

When they were ushered into the patron's office they found the pusher already there with his employer, and wearing a self-satisfied smirk, while Van Huysen's expression was black indeed.

"What's this I hear about you two?" he burst out. "Refusing work. Jumping my foreman. By Joe, I'll show you a thing or two!"

"Just a moment, Patron van Huysen," began Wingate quietly, suddenly at home in the atmosphere of a trial court, "no one refused duty. Hartley simply protested doing dangerous work without reasonable safeguards. As for the fracas, your foreman attacked us; we acted simply in self-defense, and desisted as soon as we had disarmed him."

The pusher leaned over Van Huysen and whispered in his ear. The patron looked more angry than before. "You did this with natives watching. Natives! You know colonial law! I could send you to the mines for this."

"No," Wingate denied, "your foreman did it in the presence of natives. Our role was passive and defensive throughout—"

"You call jumping my foreman peaceful? Now you listen to me: Your job here is to work. My fore-

man's job is to tell you where and how to work. He's not such a dummy as to lose me my investment in a man. He judges what work is dangerous, not you." The pusher whispered again to his chief. Van Huysen shook his head. The other persisted, but the patron cut him off with a gesture and turned back to the two labor clients.

See here—I give every dog one bite, but not two. For you, no supper tonight and no rhira. Tomorrow we see how you behave."

"But Patron van Huys—"

"That's all. Get to your quarters."

AT LIGHTS out, Wingate found, on crawling into his bunk, that someone had hidden therein a sandwich. He munched it gratefully in the dark and wondered who his friend could be. The food stayed the complaints of his stomach, but was not sufficient, in the absence of rhira, to permit him to go to sleep. He lay there, staring into the oppressive blackness of the bunkroom and listening to the assorted irritating noises that men can make while sleeping, and considered his position. It had been bad enough, but barely tolerable before; now, he was logically certain, it would be as near hell as a vindictive overseer could make it. He was prepared to believe, from what he had seen and the tales he had heard, that it would be very near indeed!

He had been nursing his troubles for perhaps an hour when he felt a hand touch his side. "Hump! Hump!" came a whisper. "Come outside. Something's up." It was Jimmie.

He felt his way cautiously through the stacks of bunks and slipped out the door after Jimmie. Satchel was already outside, and with him a fourth figure.

It was Annek van Huysen. He wondered how she had been able to get into the locked compound. Her eyes were puffy, as if she had been crying.

Jimmie started to speak at once in cautious, low tones. "The kid tells us that I am scheduled to haul you two lugs back into Adonis tomorrow."

"What for?"

"She doesn't know. But she's afraid it's to sell you South. That doesn't seem likely. The Old Man has never sold anyone South—but, then, nobody ever jumped his pusher before. I don't know."

They wasted some minutes in fruitless discussion, then, after a bemused silence, Wingate asked Jimmie, "Do you know where they keep the keys to the crock?"

"No. Why do y—"

"I could get them for you," offered Annek eagerly.

"You can't drive a crock."

"I've watched you for some weeks."

"Well, suppose you can," Jimmie continued to protest, "suppose you run for it in the crock. You'd be lost in ten miles. If you weren't caught, you'd starve."

Wingate shrugged. "I'm not going to be sold South."

"Nor am I," Hartley added.

"Wait a minute."

"Well, I don't see any bet—"

"Wait a minute," Jimmie reiterated snappishly, "can't you see I'm trying to think?"

The other three kept silent for several long moments. At last Jimmie said, "O. K. Kid, you'd better run along and let us talk. The less you know about this the better for you." Annek looked hurt, but complied docilely to the extent of withdrawing out of earshot. The three men conferred for some minutes. At last

Wingate motioned for her to rejoin them.

"That's all, Annek," he told her. "Thanks a lot for everything you've done. We've figured a way out." He stopped, and then said awkwardly, "Well, good night."

She looked up at him.

Wingate wondered what to do or say next. Finally he led her around the corner of the barracks and bade her good night again. He returned very quickly, looking shamefaced. They re-entered the barracks.

PATRON VAN HUYSEN also was having trouble getting to sleep. He hated having to discipline his people. By damn, why couldn't they all be good boys and leave him in peace? Not but what there was precious little peace for a rancher these days. It cost more to make a crop than the crop fetched in Adonis—at least it did after the interest was paid.

He had turned his attention to his accounts after dinner that night to try to get the unpleasantness out of his mind, but he found it hard to concentrate on his figures. That man Wingate, now—he had bought him as much to keep him away from that slave driver Rigsbee as to get another hand. He had too much money invested in hands as it was in spite of his foreman always complaining about being short of labor. He would either have to sell some or ask the bank to refinance the mortgage again.

Hands weren't worth their keep any more. You didn't get the kind of men on Venus that used to come when he was a boy. He bent over his books again. If the market went up even a little, the bank should be willing to discount his paper for a little more than last season. Maybe that would do it.



*"I'm not getting off where there's no land to rest on!" Satchel snapped.*

He had been interrupted by a visit from his daughter. Annek he was always glad to see, but this time what she had to say, what she finally blurted out, had only served to make him angry. She, preoccupied with her own thoughts, could not know that she hurt her father's heart with a pain that was actually physical.

But that had settled the matter

in so far as Wingate was concerned. He would get rid of the trouble maker. Van Huysen ordered his daughter to bed with a roughness he had never before used on her.

Of course, it was all his own fault, he told himself after he had gone to bed. A ranch on Venus was no place to raise a motherless girl. His Annekchen was almost a woman grown

now; how was she to find a husband here in these outlands? What would she do if he should die? She did not know it, but there would be nothing left—nothing, not even a ticket to Terra. But she would not become a labor client's vrouw. No, not while there was a breath left in his old tired body.

Well, Wingate would have to go, and the one they called Satchel, too. But he would not sell them South. No, he had never done that to one of his people. He thought with distaste of the great, factorylike plantations a few hundred miles farther from the pole, where the temperature was always twenty to thirty degrees higher than it was in his marshes, and mortality among labor clients was a standard item in cost accounting. No, he would take them in and trade them at the assignment station; what happened to them at auction there would be none of his business. But he would not sell them directly South.

That gave him an idea; he did a little computing in his head and estimated that he might be able to get enough credit on the two unexpired labor contracts to buy Annek a ticket to Earth. He was quite sure that his sister would take her in, reasonably sure, anyway, even though she had quarreled with him over marrying Annek's mother. He could send her a little money from time to time. And perhaps she could learn to be a secretary, or one of those other fine jobs a girl could get on Earth.

But what would the ranch be like without Annekchen?

He was so immersed in his own troubles that he did not hear his daughter slip out of her room and go outside.

WINGATE and Hartley tried to appear surprised when they were left behind at muster for work. Jimmie was told to report to the big house; they saw him a few minutes later, backing the big Remington out of its shed. He picked them up, then trundled back to the big house and waited for the patron to appear. Van Huysen came out shortly and climbed into his cabin with neither word nor look for anyone.

The crocodile started toward Adonis, lumbering a steady ten miles an hour. Wingate and Satchel conversed in subdued voices, waited, and wondered. After an interminable time the crock stopped. The cabin window flew open.

"What's the matter?" Van Huysen demanded. "Your engine acting up?"

Jimmie grinned at him. "No, I stopped it."

"For what?"

"Better come up here and find out."

"By damn, I do!" The window slammed; presently Van Huysen reappeared, warping his ponderous bulk around the side of the little cabin. "Now what's this monkey-shines?"

"Better get out and walk, patron. This is the end of the line."

Van Huysen seemed to have no remark suitable in answer, but his expression spoke for him.

"No, I mean it," Jimmie went on. "This is the end of the line for you. I've stuck to solid ground the whole way so you could walk back. You'll be able to follow the trail I broke; you ought to be able to make it in three or four hours, fat as you are."

The patron looked from Jimmie to the others. Wingate and Satchel closed in slightly, eyes unfriendly. "Better get goin', Fatty," Satchel

said softly, "before you get chucked out headfirst."

Van Huysen pressed back against the rail of the crock, his hands gripping it. "I won't get out of my own crock," he said tightly.

Satchel spat in the palm of one hand, then rubbed the two together. "O. K., Hump. He asked for it—"

"Just a second." Wingate addressed Van Huysen. "See here, Patron van Huysen—we don't want to rough you up unless we have to. But there are three of us and we are determined. Better climb out quietly."

The older man's face was dripping with sweat which was not entirely due to the muggy heat. His chest heaved, he seemed about to defy them. Then something went out inside him. His figure sagged, the defiant lines in his face gave way to a whipped expression which was not good to see.

A moment later he climbed quietly, listlessly, over the side into the ankle-deep mud and stood there, stooped, his legs slightly bent at the knees.

WHEN they were out of sight of the place where they had dropped their patron, Jimmie turned the crock off in a new direction. "Do you suppose he'll make it?" asked Wingate.

"Who?" asked Jimmie. "Van Huysen? Oh, sure, he'll make it—probably." He was very busy now with his driving; the crock crawled down a slope and lunged into navigable water. In a few minutes the marsh grass gave way to open water; Wingate saw that they were in a broad lake whose farther shores were lost in the mist. Jimmie set a compass course.

The far shore was no more than a strand; it concealed an overgrown

bayou. Jimmie followed it a short distance, stopped the crock, and said, "This must be just about the place," in an uncertain voice. He dug under the tarpaulin folded up in one corner of the empty hold and drew out a broad flat paddle. He took this to the rail and, leaning out, he smacked the water loudly with the blade: *Slap—slap, slap—slap!*

He waited.

The flat head of an amphibian broke water near the side; it studied Jimmie with bright, merry eyes. "Hello," said Jimmie.

It answered in its own language. Jimmie replied in the same tongue, stretching his mouth to reproduce the uncouth clucking syllables. The native listened, then slid underwater again.

He—or, more probably, she—was back in a few minutes, another with her. "Thigarek?" the newcomer said hopefully.

"Thigarek when we get there, old girl," Jimmie temporized. "Here—climb aboard." He held out a hand, which the native accepted and wriggled gracefully inboard. It perched its unhuman, yet oddly pleasing, little figure on the rail near the driver's seat. Jimmie got the car under way.

How long they were guided by their little pilot, Wingate did not know, as the timepiece on the control panel was out of order, but his stomach informed him that it was too long. He rummaged through the cabin and dug out an iron ration which he shared with Satchel and Jimmie. He offered some to the native, but she smelled it and drew her head away.

Shortly after that there was a sharp hissing noise and a column of steam rose up ten yards ahead of them. Jimmie halted the crock at once. "Cease firing!" he called out. "It's just us chickens."

"Who are you?" came a disembodied voice.

"Fellow travelers."

"Climb out where we can see you."

"O. K."

The native poked Jimmie in the ribs. "Thigarek," she stated positively.

"Huh? Oh, sure." He parceled out trade tobacco until she acknowledged the total, then added one more package for good will. She withdrew a piece of string from her left cheek pouch, tied up her pay, and slid over the side. They saw her swimming away, her prize carried high out of the water.

"Hurry up and show yourself!"

"Coming!" They climbed out into waist-deep water and advanced, holding their hands overhead. A squad of four broke cover and looked them over, their weapons lowered but ready. The leader searched their harness pouches and sent one of his men on to look over the crocodile.

"You keep a close watch," remarked Wingate.

The leader glanced at him. "Yes," he said, "and no. The little people told us you were coming. They're worth all the watchdogs that were ever littered."

They got under way again with one of the scouting party driving. Their captors were not unfriendly, but not disposed to talk. "Wait till you see the governor," they said.

Their destination turned out to be a wide stretch of moderately high ground. Wingate was amazed at the number of buildings and the numerous population. "How in the world can they keep a place this big secret?" he asked Jimmie.

"If the State of Texas were covered with fog and had only the population of Waukegan, Illinois, you

could hide quite a lot of things."

"But wouldn't it show on a map?"

"How well mapped do you think Venus is? Don't be a dope."

ON THE BASIS of the few words he had had with Jimmie beforehand, Wingate had expected no more than a camp where fugitive clients lurked in the bush while squeezing a precarious living from the country. What he found was a culture and a government. True, it was a rough frontier culture and a simple government with few laws and an unwritten constitution, but a framework of customs was in actual operation, and its gross offenders were punished—with no higher degree of injustice than one finds anywhere.

It surprised Humphrey Wingate that fugitive slaves, the scum of Earth, were able to develop an integrated society. It had surprised his ancestors that the transported criminals of Botany Bay should develop a high civilization in Australia. Not that Wingate found the phenomenon of Botany Bay surprising—that was history, and history is never surprising—after it happens.

The success of the colony, was more credible to Wingate when he came to know more of the character of the governor, who was also generalissimo and administrator of the low and middle justice. High justice was voted on by the whole community, a procedure that Wingate considered outrageously sloppy, but which seemed to satisfy the community. As magistrate, the governor handed out decisions with a casual contempt for rules of evidence and legal theory that reminded Wingate of stories he had heard of the apocryphal Old Judge Bean, "The Law West of Pecos," but again the people seemed to like it.

The great shortage of women in

the community—men outnumbered them three to one—caused incidents which more than anything else required the decisions of the governor. Here, Wingate was forced to admit, was a situation in which traditional custom would have been nothing but a source of trouble; he admired the shrewd common sense and understanding of human nature with which the governor sorted out conflicting strong human passions and suggested *modus operandi* for getting along together. A man who could maintain a working degree of peace in such matters did not need a legal education.

The governor held office by election and was advised by an elected council. It was Wingate's private opinion that the governor would have risen to the top in any society. The man had boundless energy, great gusto for living, a ready, thunderous laugh—and the courage and capacity for making decisions. He was a "natural."

THE THREE RUNAWAYS were given a couple of weeks in which to get their bearings and find some job in which they could make themselves useful and self-supporting. Jimmie stayed with his crock, now confiscated for the community, but which still required a driver. There were other crockers available who probably would have liked the job, but there was tacit consent that the man who brought it in should drive it if he wished. Satchel found a billet in the fields, doing much the same work he had done for Van Huysen. He told Wingate that he was actually having to work harder; nevertheless he liked it better because the conditions were, as he put it, "looser."

Wingate detested the idea of going back to agricultural work. He had no rational excuse; it was simply

that he hated it. His radio experience at last stood him in good stead. The community had a jury-rigged, low-power radio on which a constant listening watch was kept, but which was rarely used for transmission because of the danger of detection. Earlier runaway slave camps had been wiped out by the company police through careless use of radio. Nowadays they hardly dared use it, except in extreme emergency.

But they needed radio. The grapevine telegraph maintained through the somewhat slap-happy help of the little people enabled them to keep some contact with the other fugitive communities with which they were loosely confederated, but it was not really fast, and anything but the simplest of messages were distorted out of recognition.

Wingate was assigned to the community radio when it was discovered that he had appropriate technical knowledge. The previous operator had been lost in the bush. His opposite number was a pleasant old codger known as Doc, who could listen for signals but who knew nothing of upkeep and repair.

Wingate threw himself into the job of overhauling the antiquated installation. The problems presented by lack of equipment, the necessity for "making do," gave him a degree of happiness he had not known since he was a boy, but he was not aware of it.

He was intrigued by the problem of safety in radio communication. An idea, derived from some account of the pioneer days in radio, gave him a lead. His installation, like all others, communicated by frequency modulation. Somewhere he had seen a diagram for a totally obsolete type of transmitter, an amplitude modulator. He did not have much to go on, but he worked out a

circuit which he believed would oscillate in that fashion and which could be hooked up from the gear at hand.

He asked the governor for permission to attempt to build it. "Why not? Why not?" the governor roared at him. "I haven't the slightest idea what you are talking about, son, but if you think you can build a radio that the company can't detect, go right ahead. You don't have to ask me; it's your pidgin."

"I'll have to put the station out of commission for sending."

"Why not?"

THE PROBLEM had more knots in it than he had thought. But he labored at it with the clumsy but willing assistance of Doc. His first hookup failed; his forty-third attempt five weeks later worked. Doc, stationed some miles out in the bush, reported himself able to hear the broadcast via a small receiver constructed for the purpose, whereas Wingate picked up nothing whatsoever on the conventional receiver located in the same room with the experimental transmitter.

In the meantime he worked on his book.

Why he was writing a book he could not have told you. Back on Earth it could have been termed a political pamphlet against the colonial system. Here there was no one to convince of his thesis, nor had he any expectation of ever being able to present it to a reading public. Venus was his home. He knew that there was no chance for him ever to return; the only way lay through Adonis, and there, waiting for him, were warrants for half the crimes in the calendar—contract jumping, theft, kidnaping, criminal abandonment, conspiracy, subverting government. If the company police ever

laid hands on him they would jail him and lose the key.

No, the book arose, not from any expectation of publication, but from a half-subconscious need to arrange his thoughts. He had suffered a complete upsetting of all the evaluations by which he had lived; for his mental health it was necessary that he formulate new ones. It was natural to his orderly, if somewhat unimaginative, mind that he set his reasons and conclusions forth in writing.

Somewhat diffidently, he offered the manuscript to Doc. He had learned that the nickname title had derived from the man's former occupation on Earth; he had been a professor of economics and philosophy in one of the smaller universities. Doc had even offered a partial explanation of his presence on Venus. "A little matter involving one of my women students," he confided. "My wife took an unsympathetic view of the matter, and so did the board of regents. The board had long considered my opinions a little too radical."

"Were they?"

"Heavens, no! I was a rock-bound conservative. But I had an unfortunate tendency to express conservative principles in realistic rather than allegorical language."

"I suppose you're a radical now."

Doc's eyebrows lifted slightly. "Not at all. Radical and conservative are terms for emotional attitudes, not sociological opinions."

Doc accepted the manuscript, read it through and returned it without comment. But Wingate pressed him for an opinion. "Well, my boy, if you insist—"

"I do."

"—I would say that you have fallen into the commonest fallacy of

all in dealing with social and economic subjects—the devil theory.”

“Huh?”

“You have attributed conditions to villainy that simply result from stupidity. Colonial slavery is nothing new; it is the invariable result of imperial expansion, the automatic result of an antiquated financial structure—”

“I pointed out the part the banks played in my book.”

“No, no, no! You think bankers are scoundrels. They are not; nor are company officials, nor patrons, nor the governing classes back on Earth. Men are constrained by necessity, and then build up rationalizations to account for their acts. It is not even cupidity. Slavery is economically unsound, nonproductive, but men drift into it whenever the circumstances compel it. A different financial system— But that’s another story.”

“I still think it’s rooted in human cussedness,” Wingate said stubbornly.

“Not cussedness—simple stupidity. I can’t prove it to you, but you will learn.”

The success of the “silent radio” caused the governor to send Wingate on a long swing around the other camps of the free federation to help them rig new equipment and to teach them how to use it. He spent four hard-working and soul-satisfying weeks, and finished with the warm knowledge that he had done more to consolidate the position of the free men against their enemies than could be done by winning a pitched battle.

When he returned to his home community he found Sam Houston Jones waiting there.

WINGATE broke into a run. “Sam!” he shouted. “Sam! Sam!”

He grabbed his hand, pounded him on the back and yelled at him the affectionate insults that sentimental men use in attempting to cover up their weakness. “Sam, you old scoundrel! When did you get here? How did you escape? And how the devil did you manage to come all the way from South Pole? Were you transferred before you escaped?”

“Howdy, Hump,” said Sam. “Now one at a time, and not so fast.”

But Wingate bubbled on. “My, but it’s good to see your ugly face, fellow. And am I glad you came here—this is a great place. We’ve got the most up and coming little State in the whole federation. You’ll like it. They’re a great bunch—”

“What are you?” Jones asked, eyeing him. “President of the local chamber of commerce?”

Wingate looked at him and then laughed. “I get it. But seriously, you will like it. Of course, it’s a lot different from what you were used to back on Earth—but that’s all past and done with. No use crying over spilled milk, eh?”

“Wait a minute. You are under a misapprehension, Hump. Listen. I’m not an escaped slave. *I’m here to take you back.*”

Wingate opened his mouth, closed it, then opened it again. “But, Sam,” he said, “that’s impossible. You don’t know.”

“I think I do.”

“But you don’t. There’s no going back for me. If I did, I’d have to face trial, and they’ve got me dead to rights. Even if I threw myself on the mercy of the court and managed to get off with a light sentence, it would be twenty years before I’d be a free man. No, Sam, it’s impossible. You don’t know the things I’m charged with.”

“I don’t, eh? It’s cost me a nice

piece of change to clear them up."

"Huh?"

"I know how you escaped. I know you stole a crock and kidnaped your patron and got two other clients to run with you. It took my best blarney and plenty of folding money to fix it. So help me, Hump—why didn't you pull something mild, like murder, or robbing a post office?"

"Well, gee, Sam—I didn't do any of those things to cause you trouble. I had counted you out of my calculations. I was on my own. I'm sorry about the money."

"Forget it. Money isn't an item with me. I'm filthy with the stuff. You know that. It comes from exercising care in the choice of parents. I was just pulling your leg and it came off in my hand."

"O. K. Sorry." Wingate's grin was a little forced. Nobody likes charity. "But tell me what happened. I'm still in the dark."

"Right." Jones had been as much surprised and distressed at being separated from Wingate on grounding as Wingate had been. But there had been nothing for him to do about it until he received assistance from Earth. He had spent long weeks as a metal worker at South Pole, waiting and wondering why his sister did not answer his call for help. He had written letters to her to supplement his first radiogram, that being the only type of communication he could afford, but the days crept past with no answer.

When a message did arrive from her the mystery was cleared up. She had not received his radio to Earth promptly because she was aboard the *Evening Star*—in the first-class cabin, traveling, as was her custom, in a stateroom listed under her maid's name. "It was the family habit of avoiding publicity that stymied us," Jones explained. "If I

hadn't sent the radio to her rather than to the family lawyers, or if she had been known by name to the purser, we would have gotten together the first day."

The message had not been relayed to her on Venus because the bright planet had by that time crawled to superior opposition on the far side of the Sun from the Earth. For a matter of sixty Earth days there was no communication, Earth to Venus. The message had rested, recorded but still scrambled, in the hands of the family firm, until she could be reached.

When she received it she started a small tornado. Jones had been released, the liens against his contract paid, and ample credit posted to his name on Venus in less than twenty-four hours. "So that was that," concluded Jones, "except that I've got to explain to big sister when I get home just how I got into this mess. She'll burn my cars."

JONES had chartered a rocket for North Pole and had gotten on Wingate's trail at once. "If you had held on one more day, I would have picked you up. We retrieved your ex-patron about a mile from his gates."

"So the old villain made it. I'm glad of that."

"And a good job, too. If he hadn't, I might never have been able to square you. He was pretty well done in, and his heart was kicking up plenty. Do you know that abandonment is a capital offense on this planet—with a mandatory death sentence if the victim dies?"

Wingate nodded. "Yeah, I know. Not that I ever heard of a patron being gassed for it if the corpse was a client. But that's beside the point. Go ahead."

"Well, he was plenty sore. I don't blame him, though I don't blame you, either. Nobody wants to be sold South, and I gather that was what you expected. Well, I paid him for his crock, and I paid him for your contract—take a look at me, I'm your new owner!—and I paid for the contracts of your two friends as well. Still he wasn't satisfied. I finally had to throw in a first-class passage for his daughter back to Earth and promise to find her a job. She's a big dumb ox, but I guess the family can stand another retainer. Anyhow, old son, you're a free man. The only remaining question is whether or not the governor will let us leave here. It seems it's not done."

"No, that's a point. Which reminds me—how did you locate the place?"

"A spot of detective work too long to go into now. That's what took me so long. Slaves don't like to talk. Anyhow, we've a date to talk to the governor tomorrow."

WINGATE TOOK a long time to get to sleep. After his first burst of jubilation he began to wonder. Did he want to go back? To return to the law, to citing technicalities in the interest of whichever side employed him, to meaningless social engagements, to the empty, sterile, bunkum-fed life of the fat and prosperous class he had moved among and served—did he want that; he, who had fought and worked with men? It seemed to him that his anachronistic little "invention" in radio had been of more worth than all he had ever done on Earth.

Then he recalled his book.

Perhaps he could get it published. Perhaps he could expose this disgraceful, inhuman system which sold

men into legal slavery. He was bright wide awake now. *There was a thing to do!* That was his job—to go back to Earth and plead the cause of the colonists. Maybe there was destiny that shapes men's lives, after all. He was just the man to do it, the right social background, the proper training. *He* could make himself *heard*.

He fell asleep and dreamed of cool, dry breezes, of clear blue sky. Of moonlight—

Satchel and Jimmie decided to stay, even though Jones had been able to fix it up with the governor. "It's like this," said Satchel. "There's nothing for us back on Earth or we wouldn't have shipped in the first place. And you can't undertake to support a couple of dead-heads. And this isn't such a bad place. It's going to be something some day. We'll stay and grow up with it."

They handled the crock which carried Jones and Wingate to Adonis. There was no hazard in it, as Jones was now officially their patron. What the authorities did not know they could not act on. The crock returned to the refugee community loaded with a cargo which Jones insisted on calling their ransom. As a matter of fact, the opportunity to send an agent to obtain badly needed supplies—one who could do so safely and without arousing the suspicions of the company authorities—had been the determining factor in the governor's unprecedented decision to risk compromising the secrets of his constituency. He had been frankly not interested in Wingate's plans to agitate for the abolishment of the slave trade.

Saying good-by to Satchel and Jimmie, Wingate found embarrassing and unexpectedly depressing.

FOR THE FIRST two weeks after grounding on Earth, both Wingate and Jones were too busy to see much of each other. Wingate had gotten his manuscript in shape on the return trip and spent the time getting acquainted with the waiting rooms of publishers. Only one had shown any interest beyond a form letter of rejection.

"I'm sorry, old man," that one had told him. "I'd like to publish your book, in spite of its controversial nature, if it stood any chance at all of success. But it doesn't. Frankly, it has no literary merit whatsoever. I would as leave read a brief."

"I think I understand," Wingate answered sullenly. "A big publishing house can't afford to print anything which might offend the powers that be."

The publisher took his cigar from his mouth and looked at the younger man before replying. "I suppose I should resent that," he said quietly, "but I won't. That's a popular misconception. The powers that be, as you call them, do not resort to suppression in this country. We publish what the public will buy. We're in business for that purpose."

"I was about to suggest, if you will listen, a means of making your book salable. You need a collaborator, somebody that knows the writing game and can put some guts in it."

Jones called the day that Wingate got his revised manuscript back from his ghost writer. "Listen to this, Sam," he pleaded. "Look what the dirty so-and-so has done to my book. Look. I heard again the crack of the overseer's whip. The frail body of my mate shook under the lash. He gave one cough and slid slowly under the waist-deep water, dragged down by his chains." Honest, Sam, did you ever see such

drivel? And look at the new title: 'I Was a Slave on Venus.' It sounds like a confession magazine."

Jones nodded without replying.

"And listen to this," Wingate went on, "—crowded like cattle in the inclosure, their naked bodies gleaming with sweat, the women slaves shrank from the—' Oh, hell, I can't go on!"

"Well, they did wear nothing but harnesses."

"Yes, yes—but that has nothing to do with the case. Venus costume is a necessary concomitant of the weather. There's no excuse to leer about it. He's turned my book into a ruddy sex show. And he had the nerve to defend his actions. He claimed that social pamphleteering is dependent on extravagant language."

"Well, maybe he's got something. 'Gulliver's Travels' certainly has some racy passages, and the whipping scenes in 'Uncle Tom's Cabin' aren't anything to hand to a kid to read. Not to mention 'Grapes of Wrath.'"

"Well, I'm damned if I'll resort to that kind of cheap sensationalism. I've got a perfectly straightforward case that anyone can understand."

"Have you, now?" Jones took his pipe out of his mouth. "I've been wondering how long it would take you to get your eyes opened. What is your case? It's nothing new; it happened in the Old South, it happened again in California, in Mexico, in Australia, in South Africa. Why? Because in any expanding free-enterprise economy which does not have a money system designed to fit its requirements the use of mother-country capital to develop the colony inevitably results in subsistence-level wages at home and slave labor in the colonies. And all the good will in the world won't change



# BLOCKADE RUNNER

By Malcolm Jameson

***A good technician can make unlikely things turn into highly effective weapons, and weapons don't always have to kill to be effective!***

Illustrated by Schneeman

"THAR she blows!"

While the alarm jangled, Red Leary, the quartermaster, cocked an eye at the pulsating ruby pick-up light, noted the bearing, and then laid a hand on the jet-feed cut-off valve. He looked expectantly at the skipper.

"Hold it," cautioned the latter, "until they challenge. Sparks! Is your board manned?"

"Aye, sir."

"Rebel cruiser coming up on the port quarter. He'll be calling in a minute. Don't chance talking to him—stick to code. I'm just a little afraid of your dialect. One slip and we're done."

The call came almost instantly, strident and insistent. First it was QF, QF, QF, and on the heels of that came the peremptory BWB—"What ship?" "Heave to to receive boarding party."

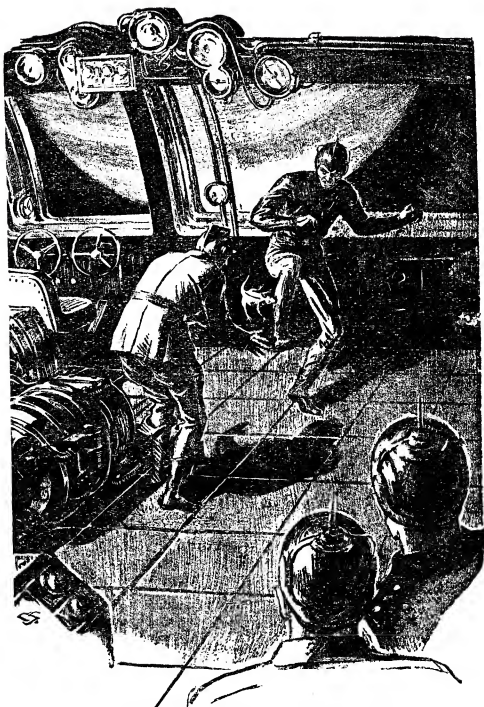
"Vast blasting," ordered Kemp. "Tell 'em O. K., Sparks."

Red's hand moved. The *Cloud Queen* trembled, then lurched backward as she dropped her acceleration. The three men looked at one another. Here it was; in another half-hour, at most, they would know. Their elaborate masquerade was about to be tested. They would know the answers to a lot of questions. Whether they would meet the unknown fate of the fourteen ships that had preceded them; whether the

Martian-Jovian blockade was really unbreakable; whether they were to live or die; whether, indeed, there was a chance left for the Earth Empire to live or die. Red swallowed hard, while Sparks moistened his lips with a nervous tongue. Kemp, the skipper, was surveying the room critically, on the alert for any item, hitherto overlooked, that might arouse suspicion. Seeing nothing, he relaxed. The stage was set—from now on it must be acting.

No one who had formerly known Jack Kemp, resourceful and trim young lieutenant of the Tellurian Space Force, would have recognized him as he appeared at that moment. His face was all but covered by a newly grown, fierce black beard that had been artfully threaded with gray by the experts of the chromosurgery section of Intelligence. It matched the equally artificial grayness of his temples. The deep tan of the ray-burned spaceman was not synthetic, but somehow seemed to be set off and augmented by the threadbare old uniform trimmed in tattered, greenish-gold lace. In every inch he looked to be what he was pretending to be—the somewhat bedraggled skipper of a second-rater out of Venus. The crew as well, likewise ratings of the Space Force, were similarly disguised.

As for the ship, no one familiar with the well-found ships of the Cos-



*Leary played their trump; the trigglemouse immediately nipped and bit hard on the boarding officer's leg.*

mos Line would ever guess that this dingy vessel was in reality the *Violet*, well known before the war along the Saturnian run. Her metamorphosis had been as thorough as that of the men in her, thanks to the creative imaginations and the accurate memories of a dozen operatives at Lunar headquarters.

No detail of hull, equipment or cargo had been overlooked. The framed register screwed to the bulkhead in the cabin was puckered and stained with ugly brown water marks, as if a negligent quartermaster had left the lock doors open while cradled in the steamy atmosphere of her home port. The crew's quarters were decorated with intimate snapshots of alluring females taken against the fantastic background of Venusian scenery. Every man on board was not only provided with forged licenses and passports, but with personal correspondence written in many hands on the damp-proof paper of Venus and bearing appropriate stamps and cancellations. Outside, clinging to every irregularity in the hull, were patches of the hardy Venusian moss that thrives even in the void, planted there by a crafty technician from London's great interplanetary botanical garden. And, of course, bolted to the hull just over the ship's nose was the inevitable hemi-cylinder housing the infrared headlight by which the master could find his way through the misty ceiling down to the landing field of Aphrodite's Haven. If anywhere among all that artistry there was a single flaw, it was not from want of foresight or trying.

A SLIGHT shudder marked the coming alongside of the cruiser's boat. Kemp pushed the switch that turned on the lights in the lock and

loosed the guard on the outer door. Then he reached up and plucked from its brackets a Mark IX Heimnitz blaster—the sporting model. Sticking that into his holster, he walked along the passage to greet his adversary.

He knew from the clang of the outer door and the hissing of air that the boarders were already in the lock. In a moment the door burst open and a scowling officer stepped out, followed closely by two bluejackets with drawn ray guns of the latest heavy-duty model. Kemp knew at a glance they were Callistans from the silver lozenges embroidered on their uniforms. Only a Callistan would wear such a device. In the beginning, when Callisto was a Tellurian penal colony, lozenges were woven into the cloth of their garments as the stigmata of criminality. Yet so shameless is that race that upon gaining their independence ten years ago, they adopted the lozenge as their national insignia and thereafter flaunted them openly throughout the system.

"Jig's up," said the Callistan briefly as he stepped into the ship. Without ceremony, he snatched the blaster from Kemp's belt and handed it to one of his men. "Save the act until later," he added contemptuously as Kemp jumped backward, registering indignant astonishment. Then he turned on his heel and strode toward the control room. Kemp followed, silent and perturbed. The boarding officer was not going to be an easy man to deal with.

"Swell job of camouflage," commented the Callistan after a quick inspection of the control room. "If they had faked your first ships like this, you might have got by with one of them." He studied Kemp insolently, and then, "O. K., buddy. Go into your song and dance now—I'm

listening. It's been dull out here, waiting for you, and we need a laugh. And I hope you've thought up a new one. The gag about being an innocent Venusian merchantman just trying to get along in the Universe has been worked to a frazzle. But shoot, anyway. Only make it short and snappy, because I already know the answer."

Kemp shrugged his shoulders and spread his hands in a gesture of hopelessness. So far the Callistan was bluffing, and Kemp knew it.

"What else can I tell you? But look us over—our papers—our holds—everything, if you doubt us."

"Doubt you?" roared the big Callistan with a hearty laugh. "Why, Mr. Tellurian Space Force Whatever-your-rank-is, I haven't *any* doubt about you. There's a couple of things I don't *know* about you—like what your real name is—but out at the mines that won't matter. They'll give you a number, anyway."

He started his search methodically, missing nothing, however trifling. He thumbed through the log, squinted at the makers' nameplates on each bit of astragational gear, scratched the mold-resisting paint to see what was under it, and sniffed the air appraisingly. Thanks to the still-hanging fumes of huil-huil, it had a thorough-going Venusian aroma. He glanced at the big jar of crushed, dried huil-huil leaves sitting on the radioman's desk. Not more than a handful of the weed so prized by space-going Venusians was gone from the jar—no more than half a dozen men could smoke in the day or so since the *Cloud Queen*, as she claimed, had escaped internment at Luna Base.

The flat, brutal face lit up with that I-told-you-so joy, and he pointed triumphantly at the nearly full jar.

"An empty one might have fooled me," he fairly shouted, "but now I've seen all I want to see. You guys always overdo your stuff. Look, stupid—you been interned on Luna, where you can't get that weed—a year, you say—locked up all the time in your ship. And then, two days ago, you hop off all hunky-dory with a nice full jar. I ask you. How does that add up?"

Kemp smiled patiently, letting his meticulously yellowed teeth show through his beard.

"My friend, you are too, too suspicious. We have tons of it. In the hold you will find ten thousand pounds. Look in the manifest; it is part of our cargo—bound for your country, for Ganymede. It is true we have swiped a few hundred pounds for our own use, a matter we will have to settle for with the consignee, but our laws permit us to make use of cargo in an emergency. And being captured by those accursed Earthmen is an emergency."

THE CALLISTAN looked a little dubious, but he accepted the manifest and the invoices. He looked through them and then went on a tour of the ship. For an hour he prowled through the cargo spaces, but nowhere could he find any irregularity. They were filled with products of Venus, all articles of common commerce with the Jovian satellites. Nor could he find any indication of concealed armaments. The ship was plainly no Q-boat, as a quick look at the engine room proved. There was only the usual auxiliary generating equipment. The ship could not possibly be made into a commerce raider.

Back in the control room, the boarding officer dropped his taunting, bullying air and listened more politely to Kemp's story, although it

was clear he was reluctant to release the vessel and permit her to complete her voyage.

Kemp kept on talking, telling of his hard luck at being picked up during the very first week of the war, and of the hardships of internment, of the pitiful inadequacy of the Tellurian fleet and the incapacity of its officers, and of the general state of despair prevailing on the Moon. He also made much of the fact that he had successfully resisted all efforts to take the cargo out of his ship and put it to use on the grounds that it would be a violation of Venus' neutrality and might force her into war on the other side.

The Callistan frowned, obviously in a quandary. He was still unconvinced. He had uncovered nothing that was not plausible, yet nothing he had seen could not have been faked. He meant to take no chances on letting a prize slip through his fingers. Yet he knew that Venus was opposed to this resumption of the war and was itching for an excuse to patch up her differences with the mother planet and come to her aid. Kemp sensed his hesitation, and by an almost imperceptible twitch of an eyelid got the signal across to Red Leary. The time had come to play their trump.

Red's freckle-specked hand stole behind him and fumbled for a button. On the third try he managed to trip the latch on a small cupboard, the one where the star charts were ordinarily kept. Kemp went on talking, pleading now to be allowed to go on to his destination.

"Hell and damnation!" yelled the Callistan, leaping frantically. Something disreputably ragged-looking and dirty white was clinging to a wildly kicking calf.

"So sorry," cried Kemp in dismayed apology, and dived for it.

For a moment he was busy dodging the boarding officer's scuffling knees, but after a false grab or two he came up clutching a queer and malodorous little animal by the scruff of the neck. "I should have warned you about Flo-Flo. She doesn't like strangers."

The creature was a full-grown triglemouse, one of those feathered rodents peculiar to Venus. For some reason unfathomed by the remainder of the inhabitants of the Solar System—unless it was blind superstition—the men of Venus cherished the beasts. No ship from there ever took the void without one as a mascot. Yet they stank and they stole and they nipped friend and foe alike with their sharp, chiselly teeth, and they had other habits that, to say the least, were not nice. In fact, the aversion to them was so strong among most Earthmen that when Flo-Flo was requisitioned, all the zoos of the Earth had to be combed before she could be located.

The Callistan glowered for a long time after he had blasted the miserable animal out of existence, but as his curses died away it was obvious enough that whatever lingering doubts he may have had as to the authenticity of the *Cloud Queen* were dissipated. With a snort he stalked to the chart rack and entered the fact of his inspection in the log and indorsed it. Then he flung off down the passage, beckoning his two men to follow him.

"Get this stinkpot out of here. I'm through with you," he said as the lock door closed behind him.

"Aye, aye, sir. Thank you, sir." Kemp felt he could afford a little politeness. He was *through*; and in his hand he held a scribbled memorandum of the correct answers to challenges for the next three weeks—the time necessary to reach Gany-

mede. The Callistan had given him the recognition signals to expedite his trip, so convinced was he that he was dealing with a genuine Venusian.

"WELL," said Kemp as he set his jets going again, "that's that. Now all we have to do is straighten out for Oberon, fake a new set of papers, trade this stuff for what we want, and then get back in again."

"That last will be tough, I'm thinking," remarked Red.

"Tough?" was Sparks' contribution. "Damn near impossible, I call it."

"As long as that 'near' is in we're O. K.," said Kemp cheerily. "Give 'er another G, Red. We can stand it."

THREE times before they cleared the last of the asteroids they were challenged by roving cruisers, but thanks to knowing the answers and also to the general belief that the Earth blockade was break proof, she was not halted and searched again. Kemp had time to consider his next steps.

The more he pondered the enormous task assigned him, the more he was struck with the irony of the situation. The Earth, mistress of the remnants of what had been the far-flung Tellurian Empire, and a hundredfold more populous and rich than all the other peoples of the Solar System combined, was lying helpless before the might of two of her erstwhile colonies. They lacked the men and the resources to invade the mother planet, but they could, and had, cut her off from all intercourse without. Their strategy was simple. While holding the Tellurian fleet immobile, they would sweep up the remaining Earth colonies—the the Saturnian System and what lay beyond. After that they would con-

trol the only known supply of the fuel upon which civilization had become dependent. Earth would thereafter have to pay through the nose, for the ultra-powerful Eka-Uranium existed only on Oberon.

This anomalous state of affairs had been made possible by the weak and parsimonious policy followed by the grand council after the successful War of the Rebellion a decade earlier. Having granted the three revolting planets their liberty and signed perpetual treaties of friendship, the Earth allowed its fleet to deteriorate until it was no more than a mere customs patrol. On the other hand, the colonists, embittered by long years of misrule, wanted more than independence—they wanted revenge. Hence they at once began building on a vast scale, but secretly. And when those fleets were strong enough, they struck. Earth, caught utterly unprepared, could not strike back.

They built feverishly, trying to make up for the error of unpreparedness. Every sky yard on the planet worked night and day turning out ships. Soon, every week saw sleek new units, bristling with the most modern armament, making the short jump to Luna, where they were given crews and joined to the fast-growing fleet. In the course of a few months they almost equaled the blockading squadron. A few more months and they would excel it. And then a shocked world learned the awful truth—there was no fuel for such a tremendous fleet. The pacifistic and incapable council had not foreseen this contingency and had provided no reserves. There was only fuel enough for one take-off, and that one necessarily of short duration. What there was must be conserved for emergencies—such as sudden destructive raids on the great Earth cities themselves. Therein lay the

delicious irony of the situation. The blockade prevented the arrival of the fuel by which the blockade could easily be broken. Given fuel, the Earth could have all the fuel there was; without it, she must soon capitulate, for it was needed for civil purposes, also. There was already much suffering.

Ship after ship had made the attempt, trying every sort of ruse and trick. None had come back. Kemp had been permitted to make one last try. If he returned within the allotted time, the war would be won; if not, it was to be surrender.

It had been left to him what disguise he would use, and what plan. He chose the simplest one of all—that of a straight merchant ship with no reservations. He had the feeling that the others had been unmasked by their secret armament, and therefore he resolved to carry none. No matter how cleverly concealed, weapons—if adequate—could not escape a really thorough search. The thing must be done by guile, and to that he bent every effort, knowing that success or failure hung on some tiny detail.

ONCE past the blockading cruisers, he was confronted with the next step—the acquisition of a thousand tons of Eka-Uranium at Oberon. He soon learned, by listening in on the enemy radio, that Oberon had long since fallen and was garrisoned by an expeditionary force from Mars. The *Cloud Queen's* papers would have to be altered to meet another hostile scrutiny, all mention of the fictitious sojourn on Luna must be deleted, and the destination changed. When he had completed his work, the documents purported to show that the ship was straight out of Venus for the outer planets, with cargo unconsigned. Her captain was authorized

to trade at discretion and return. He took good care, too, that the page bearing the endorsement of the boarding officer was left in the record. It showed the ship to have been inspected and passed by a control officer.

All went smoothly in Spriteburg. A shipload of Venusian products was most welcome on the desolate planet, and no one raised embarrassing questions. Beyond some haggling as to price and considerable well-simulated indignation at the interplanetary exchange rate quoted, Kemp was called on for little effort. The afternoon of the second day, after he had discharged his cargo, he shot the *Cloud Queen* over the Elfin Range and laid her into the landing docks at the mines. Twenty-four earthly hours after that he was chockablock full of the precious Eka-Uranium. There were a thousand tons of it—enough to fuel the entire new Tellurian fleet to capacity, and with some to spare.

It was not until he called at the captain of the port's office for his clearance papers that he had any premonition of trouble to come. The day of his arrival he had dealt with a deputy, but now it was different. A man sat there whom he had seen before. In a moment he placed him. At the time when he had been in the circumsolar patrol, four years earlier, this captain of the port had been resident on Venus as consul general for Mars. As such he could be expected to be fairly familiar with Venusian shipping. Kemp was thankful for his beard and grayed hairs, for on several occasions he had dined with the man.

The captain of the port signed the papers without a word. As he handed them across the desk to Kemp, he said, in an offhand way.

"I see you are owned by Turnly & Hightower. Please give my regards

to Mr. Turnly when you hit Venus again. By the way, how is the old boy? Someone told me he had not been well lately."

"Oh, he keeps going," laughed Kemp, pocketing the papers and the Manual for the Guidance of Neutral Vessels that was handed to him with it. He was affecting a casualness about it that he was far from feeling. In his researches in connection with outfitting the *Cloud Queen*, he had been unable to learn much about her fictitious owners. There was a photo on board showing Mr. Hightower in the front door of the home office, surrounded by the clerical staff, but concerning the senior partner Kemp had been unable to learn anything. It was the weakest link in his armor, and he was ardently hoping the conversation would take another turn.

"So he keeps going," murmured the port captain dreamily, drumming softly on the desk with his plump white fingers. "Hm-m-m. Most uncanny, really." He regarded Kemp thoughtfully for a moment, and then, suddenly, as if aroused from a deep daydream, rose and took his hand. "Well, captain, you may as well take off. Follow the trajectory assigned and you'll have no trouble. A clean void and a happy landfall to you. And don't forget my message—Horntrimmer is the name."

As the *Cloud Queen* sped along trajectory XXX-B-37, dutifully doing all the things required by the Martian-Jovian rules, Kemp turned this little talk over and over in his mind. He didn't like it. There was something vaguely ominous about it. Why uncanny? Horntrimmer's attitude had been peculiar, to say the least. Yet he had permitted the ship to clear when it would have been easy to hold her. If he had been suspicious of her, again why?

Kemp had no answers to these questions, but they troubled him, nevertheless. He spent his spare hours prowling the ship or standing in the auxiliary motor room, studying the equipment. He was racking his brain for a means to improvise a method of defense if it came to that, but he found little ground on which to base his hopes. None, in fact, for the power plant was just sufficient to operate the ship's legitimate auxiliaries without a dozen kilowatts to spare. Nor was there an ounce of any sort of explosive aboard. The ship was truly unarmed. If its disguise failed, all was lost. The only way to break the blockade was to adhere to the plan agreed upon before leaving Luna.

That plan was daring in its simplicity, and two thirds of it had been accomplished. There was left only the last step. Exactly two hundred hours before striking the sphere of swirling enemy cruisers that constituted the blockade, the *Cloud Queen* was to send out a certain signal and keep repeating it until its receipt was acknowledged. Then she was to climb out of the ecliptic so that she could dive onto Earth from the north, through a region that was thinly patrolled. A few hours before her arrival at the barrier a picked squadron of heavy Tellurian battle-ships would make a vigorous attack upon a nearby segment of the blockade, using what was left of their hoarded fuel to create a diversion so that the blockade runner could slip through. Cruisers rushing to meet the Tellurian feint would not stop to examine a rusty merchantman, even if they detected her, was the theory. It was upon such a slender thread that the hopes of the Earthmen hung.

It was over the asteroids that Kemp sent his signal, set his deflec-

tors for hard rise, and climbed still higher. And it was but a matter of some eight hours later that the keys of the radio began to clatter out the harsh orders of a pursuing cruiser. The fast Callistan *Folliot* was overhauling the *Cloud Queen* and demanding that she blast down and wait. Kemp's face was drawn and the lines in it hard as he listened to the words being tapped out, but there was nothing to do but comply. He gave the necessary orders.

"As I live and breathe," exclaimed the boarding officer as the inner door of the lock slid open, "if it isn't my old friend, the Venusian! Fancy meeting you here!" It was the identical Callistan who had made the examination on the way out. He oozed sarcasm from every pore. "And—oh, yes, before I forget it—Commodore Horntrimmer instructed me to tell you that Mr. Turnly died three years ago. He was his father-in-law." The Callistan chuckled maliciously. Then he turned to the officer and group of men who had come aboard with him.

"Check these dopes for guns, then set watches. After that you can stow your baggage and settle down. We'll take this bucket in on this course and refuel our own fleet with it." He leered triumphantly at the crest-fallen Kemp.

CAPTAIN KEMP and his men were not locked up, but forced to carry on their regular duty under the watchful eyes of the prize crew. One or the other of the two officers was always in the control room, sitting in the master's seat at the midst of the main switchboard. Two armed blue-jackets stood at the door, ready to carry out any command. The Callistan who had seized the vessel—one Commander Tilsen—produced a fat volume with locked covers and

began sending long code messages. The *Folliot*, which had hovered ten or twelve miles on the beam all the while, dashed away, spewing violet fire in her wake. The *Cloud Queen* was left to make the rest of her way alone.

Kemp was forced to stand the same watch as Tilsen took, and had to bear the incessant stream of exultant remarks emanating from him. Although he pretended he had never been fooled in the first place, but had allowed the ship to go on through, knowing full well they could intercept it at will, Kemp knew that he was lying—trying to save face. Tilsen predicted with great relish that as soon as the cargo had been discharged, Kemp would be hustled off to Mars and hanged ignominiously as a spy, together with all his men.

During the first rest period, Kemp lay and tossed and fretted, going over in imagination for the hundredth time every detail of the ship he had come to know well. He must do something, if only warn Earth of the existing state of affairs. But cudgel his brain as he would, he could think of no way to devise a weapon by which he could wrest control from his captors. And then, as he was mentally following the wiring diagram of the vessel for the nth time, a thought struck him as abruptly and as clearly as if a gong had been struck. The infrared projector, of course! There was power—of a sort; five million volts, even if the amperage was trifling. Surely something could be done with that.

That time when the rest period was up he marched to the control room gladly. There were a few details of the ship's construction he had never troubled to note. Now they had taken on a new meaning.

Throughout that watch, his eyes sought the overhead every time he

felt the gaze of the sentries off of him. He was interested in the exact location of the housing of the searchlight perched on the hull above. It was clearly delineated by the double row of rivets, the center being almost directly over the seat whereon the Callistan Tilsen sat, talking glibly of the tortures the Martian code permitted on certain types of condemned prisoners. Kemp yawned as, he pretended to listen, his mind busy with multiplying and adding the estimated distance between groups of rivets. Before the watch was over he knew what he wanted to know, and spent the remainder of the time memorizing the facts he had observed.

That rest period he did not toss and fret. He knew precisely what he wanted to do. Fifteen minutes after the watch below had settled to its rest, Kemp was scudding down the darkened passage, bound for the engineer's storeroom. Except for the guards in the control room, and one in the auxiliary generator room, the ship was unpatrolled. The captors were contemptuous of their victims, serene in the belief that there was nothing they could do.

Kemp shut the door of the storeroom behind him. A moment later he was hard at work with a hacksaw,

cutting off a six-foot length of one-inch round copper bar taken from the electrical stock. And when he had done that he seized a file and beveled one end of it to as nearly forty-five degrees as he could make it. It was but a matter of minutes before he was done, for the metal was not hard.

Up to that point he was well satisfied, but when he went to get a heavy-metal disk he found that what he wanted was not in store. He took down a tube hand-hole plug and examined it critically. It was of platinum, four inches in diameter, but much too thick—it would not do. For fifteen minutes he pawed through the bins, but all the disk-shaped pieces were too wide or not wide enough, or of light metals such as steel and bronze. A high atomic number he *must* have.

Just as a fresh wave of discouragement swept over him, he thought of the handful of 100-uran pieces he had taken in Oberon to adjust the differences of the values of the cargoes he had traded. Those massive three-inch coins were minted of gold, alloyed with a little iridium. For shape, size and composition they were exactly what he needed. Before the watch was over he had brazed one neatly to the beveled end



of his long copper rod, and the face of the tilted disk shone like a mirror where he had filed it smooth. He stood it in a corner, along with the tube scrapers, and went back to his bunk, well pleased with his first step.

THE SEEMINGLY interminable tour of duty came to an end. Kemp counted the seconds, after they had been relieved, so anxious was he to get on with the task he had set himself. At the end of ten minutes all appeared to be quiet, so he stole away to the storeroom. His odd-shaped rod was still there, unmoled. He took a space helmet from the rack and put it on. He slung the brazing kit over his shoulder, picked up a sledge, a pair of wrenches, and the gold-tipped copper rod and made his way to the space lock.

No one heard him go out, for he eased the doors very carefully to, and the hull was so well insulated that once he was outside the slight noise caused by his scuffing shoes could not be heard within. He crawled straight for the headlight and stacked his tools beside it. One by one he backed off the nuts that held the focusing lens to its frame. Then he lifted it out and went to work on the filters behind it. At the end of the half-hour he had come to the front end of the vacuum tube itself, which he broke with one hard lick of the sledge. It was a trying and dirty job to pry the complicated heating elements out, and he had to watch out for the the fragments of the tube, but within another hour he had the tube clean of all it had formerly held. He lay full length in a hollow cylinder, ten feet long by a yard in diameter. Near each end of it were the cable terminals, waiting to be tapped.

Swiftly he erected the rod on the base formed by the inner end, and

brazed it into place. Then he hooked it up to the cable end. He had formed the cathode of his contrivance. He backed away to the open end of the housing, and there he rigged an anode. When he was done he replaced the outermost piece he had removed to get in, bolted it fast, then went below. His watch showed he had an hour to spare. He had plenty of time to whisper a few words of instruction to Sparks, under whose desk the foot switch that operated the headlight was located.

When they went on watch again, Sparks kicked the switch shut, and Kemp took up his surreptitious vigil. He knew it would take time, but he did not know how much. He knew there were going to be some extraordinary results, but he did not know quite what. But three hundred milliamperes flung at a golden disk at five million volts' pressure was sure to do something.

THE WATCH wore on, with Tilsen's customary string of jibes. At the end of the first hour the Callistan's flow of words began to jerk to a stop more frequently, and the pauses between bursts became longer. The man began to wear a puzzled, hurt expression, and several times he took off his cap and rubbed his head. He did not seem to notice that hair by the handful showered down upon his shoulders after the last such head-caressing.

"What the hell has gone wrong with the air?" he screamed suddenly, springing up from his seat and then settling back into it. "Oh, how my head aches!"

Red Leary checked the indicators and sang out their readings. Everything was normal; the air-conditioning system was functioning perfectly. The big Callistan scowled at him, not acknowledging, but apparently ac-

cepting what Red said. He resumed his former position, but would stoop ever so often to snatch at his leg. Presently he called to one of the Callistan sailors who stood on guard at the back of the room. When the sailor came up to him he leaned forward and plucked some imaginary something away from his thigh.

"Take that damn thing out and kill it," he directed, his voice full of venom. "Blasted wild cat!"

After that he slumped a little in the saddle and dropped his chin on his chest, brooding. Kemp measured his posture carefully by eye and wondered whether the tilt of his head had thrown him out of the cone of invisible rays that was playing down from above. But apparently it had not, for at the end of another quarter hour Tilsen sprang suddenly erect, his eyes almost starting from his head.

"Back! Back! Back 'er full! Glaciers ahead!" He was shrieking wildly and clawing at the board in front of him. A trembling hand came to rest on a glazed clock face, and the smooth crystal seemed to soothe him. He ceased yelling and sat shuddering as he was, with beads of cold sweat rolling off his brow and splashing down onto the board. One of his ears twitched violently, fluttering like a leaf in the breeze. The two bluejackets had come up closer and were watching him in alarm, wide-eyed.

"Shall I call your relief, sir?" asked one of them timidly.

Tilsen was a hard man, even with his own. He swung in the chair, staring coldly and malignantly at the man. "So serpents speak in this valley?" he hissed, sliding out of his chair into a half crouch, as if about to spring at the unfortunate man. His hand went to the butt of his ray gun as the terrified sailor backed

away from him. Like lightning, he drew and went into frenzied action. He cut down the first sailor with a blast that seared away half his chest, and before the other could bring himself to fire on his own officer, him, too, he blasted. Then, with a mighty curse, he flung his gun at the bodies and stood swaying drunkenly where he stood.

Kemp looked on with awe, wondering what his handiwork would bring next.

Just as the other officer appeared in the doorway with the remaining sailors crowded behind, Tilsen seemed to lose all interest in his surroundings. He began picking at himself, slowly at first, as if to rid himself of imaginary ants, and then more wildly, until in another minute he was tearing at his clothes as if they were on fire. Then he gave one ear-splitting scream and fell to the deck in convulsions, rolling, kicking and biting. It was there that his fellow countrymen overpowered him and slipped the irons about his wrists and ankles.

"What did you do to him?" demanded the officer of Kemp furiously.

Kemp shrugged. "He went mad—that is all. How could I help that?"

The officer gazed at the helpless, writhing form at his feet. Not the most casual glance could miss noticing the horrible condition of the head. Not only had the hair been stripped away from top and back, but the skin and the superficial flesh as well. It was as if a mysterious flame had seared it. Yet no known weapon made such a wound—a blaster would have burned the whole skull away.

He examined the room intently, and even went so far as to expose plates set at various angles about the

master's chair, but Sparks had kicked his switch open long before—at the moment the crazed Callistan had sprung from the seat. The developed plates showed nothing.

"That's damned funny," muttered the Callistan lieutenant as he studied them. "It *must* have been hard radiation—nothing else could have made those brands."

He frowned and tossed the featureless plates into a corner. Maybe his commander was just a bit crazy, after all, he told himself. There had been occasions—

"I'll take over," he barked, glowing at the watching Earthmen.

Then he slid into the master's seat himself.

"THAT'S the story," finished Kemp three days later. "We did the same thing to his sidekick. After that the men were easy. We brought in two alive."

He was standing before the desk of the admiral commandant of Luna base. Outside, safely nestled in the vast crater, the battered *Cloud Queen* lay, a huge battleship alongside either side, taking on the vital fuel.

"Thanks to the battle you put on, as per schedule, there was only one enemy cruiser in our way, and we fooled him into letting us pass. We had the Martian code book, you know. We sent him a tripled triple-X, which in their code signifies, 'On urgent confidential mission of highest importance; do not interfere.'"

"Nice work," congratulated the admiral. "I'll see that you get the Celestial Cross and a promotion at the very least. But how—"

"Gamma rays," said Kemp. "I knew they played hell with living organism, so the only problem I had was to rig up a giant X-ray machine where I could bring it to bear on those birds, knowing that they would not suspect until it was too late. You can't feel the things, you know."

"For that I needed a huge vacuum tube, a cathode of the right material, and scads of voltage. By going outside the hull I had my vacuum ready-made; the cathode I improvised out of stuff on board; the voltage was already there, awaiting the flip of a switch. The fact that the gamma rays had to go through an inch of iridium steel didn't detract much from their poisonous qualities. In fact, I imagine the secondary radiations from the radiated iron did almost as much damage as the hard stuff bouncing off that gold 100-uran piece. Anyhow, it was enough to addle their brains. By the time their reaction was strong enough to tip them off that something was wrong, they were too far gone to be able to add two and two and get anything out of it."

"Sort of homemade Coolidge tube, eh?" observed the admiral commandant.

"Sort of," grinned Kemp, thinking of the unholy mess he had made of a perfectly good Venusian infrared searchlight. "But it worked."

THE END.



# MASQUERADE

By Clifford D. Simak

***The Roman Candles of Mercury weren't the fireworks kind—they were alive. Everybody knew that, and that they could make mirages. But they didn't know how good they were—***

Illustrated by Eron

OLD CREEPY was down in the control room, sawing lustily on his screeching fiddle.

On the sun-blasted plains outside the Mercutian Power Center, the

Roman Candles, snatching their shapes from Creepy's mind, had assumed the form of Terrestrial hillbillies and were cavorting through the measures of a square dance.

In the kitchen, Rastus rolled two cubes about the table, crooning to them, feeling lonesome because no one would shoot a game of craps with him.

Inside the refrigeration room, Mathilde, the cat, stared angrily at the slabs of frozen beef above her head, felt the cold of the place and meowed softly, cursing herself for never being able to resist the temptation of sneaking in when Rastus wasn't looking.

Up in the office, at the peak of the great photocell that was the center, Curt Craig stared angrily across the desk at Norman Page.

One hundred miles away, Knut Anderson, incased in a cumbersome photocell space suit, stared incredulously at what he saw inside the space warp.

THE communications bank snarled warningly and Craig swung about in his chair, lifted the handset off the cradle and snapped recognition into the mouthpiece.

"This is Knut, chief," said a voice, badly blurred by radiations.

"Y'es," yelled Craig. "What did you find?"

"A big one," said Knut's voice.

"Where?"

"I'll give you the location."

Craig snatched up a pencil, wrote rapidly as the voice spat and crackled at him.

"Bigger than anything on record," shrilled Knut's voice. "Space busted wide open and twisted all to hell. The instruments went nuts."

"We'll have to slap a tracer on it," said Craig, tensely. "Take a lot of power, but we've got to do it. If that thing starts to move—"

Knut's voice snapped and blurred and sputtered so Craig couldn't hear a word he said.

"You come back right away,"

Craig yelled. "It's dangerous out there. Get too close to that thing. Let it swing toward you and you—"

Knut interrupted, his voice wallowing in the wail of tortured beam. "There's something else, chief. Something funny. Damn funny—"

The voice pinched out.

Craig shrieked into the mouthpiece. "What is it, Knut? What's funny?"

He stopped, astonished, for suddenly the crackle and hissing and whistle of the communications beam was gone.

His left hand flicked out to the board and snapped a toggle. The board hummed as tremendous power surged into the call. It took power—lots of power, to maintain a tight beam on Mercury. But there was no answering hum—no indication the beam was being restored.

Something had happened out there! Something had snapped the beam.

Craig stood up, white-faced, to stare through the ray filter port to the ashy plains. Nothing to get excited about. Not yet, anyway. Wait for Knut to get back. It wouldn't take long. He had told Knut to start at once, and those puddle jumpers could travel.

But what if Knut didn't come back? What if that space warp had moved?

The biggest one on record, Knut had said. Of course, there always were a lot of them one had to keep an eye on, but very few big enough to really worry about. Little whirlpools and eddies where the space-time continuum was wavering around, wondering which way it ought to jump.

Not dangerous, just a bother. Had to be careful not to drive a puddle jumper into one. But a big one,

if it started to move, might engulf the plant—

Outside, the Candles were kicking up the dust, shuffling and hopping and flapping their arms. For the moment they were mountain folk back in the hills of Earth, having them a hoe down. But there was something grotesque about them—like scarecrows set to music.

The plains of Mercury stretched away to the near horizon, rolling plains of bitter dust. The Sun was a monstrous thing of bright-blue flame in a sky of inky black, ribbons of scarlet curling out like snaky tentacles.

Mercury was its nearest to the Sun—a mere twenty-nine million miles distant, and that probably explained the warp. The nearness to the Sun and the epidemic of sunspots. Although the sunspots may not have had anything to do with it. Nobody knew.

CRAIG had forgotten Page until the man coughed, and then he turned away from the port and went back to the desk.

"I hope," said Page, "that you have reconsidered. This project of mine means a lot to me."

Craig was suddenly swept with anger at the man's persistence.

"I gave you my answer once," he snapped. "That is enough. When I say a thing, I mean it."

"I can't see your objection," said Page flatly. "After all, these Candles—"

"You're not capturing any Candles," said Craig. "Your idea is the most crackpot, from more than one viewpoint, that I have ever heard."

"I can't understand this strange attitude of yours," argued Page. "I was assured at Washington—"

Craig's anger flared. "I don't give a damn what Washington assured

you. You're going back as soon as the oxygen ship comes in. And you're going back without a Candle."

"It would do no harm. And I'm prepared to pay well for any services you—"

Craig ignored the hinted bribe, leveled a pencil at Page.

"Let me explain it to you once again," he said. "Very carefully and in full, so you will understand."

"The Candles are natives of Mercury. They were here first. They were here when men came, and they'll probably be here long after men depart. They have let us be and we have let them be. And we have let them be for just one reason—one damn good reason. You see, we don't know what they could do if we stirred them up. We are afraid of what they might do."

Page opened his mouth to speak, but Craig waved him into silence and went on.

"They are organisms of pure energy. Things that draw their life substance directly from the Sun—just as you and I do. Only we get ours by a roundabout way. Lot more efficient than we are by that very token, for they absorb their energy direct, while we get ours by chemical processes."

"And when we've said that much—that's about all we can say. Because that's all we know about them. We've watched those Candles for five hundred years and they still are strangers to us."

"You think they are intelligent?" asked Page, and the question was a sneer.

"Why not?" snarled Craig. "You think they aren't because Man can't communicate with them. Just because they didn't break their necks to talk with men."

"Just because they haven't talked

doesn't mean they aren't intelligent. Perhaps they haven't communicated with us because their thought and reasoning would have no common basis for intelligent communication with mankind. Perhaps it's because they regard Man as an inferior race—a race upon which it isn't even worth their while to waste their time."

"YOU'RE crazy," yelled Page. "They have watched us all these years. They've seen what we can do. They've seen our space ships—they've seen us build this plant—they've seen us shoot power across millions of miles to the other planets."

"Sure," agreed Craig, "they've seen all that. But would it impress them? Are you sure it would? Man, the great architect! Would you bust a gut trying to talk to a spider, or an orchard oriole, or a mud wasp? You bet your sweet life you wouldn't. And they're great architects, every one of them."

Page bounced angrily in his chair. "If they're superior to us," he roared, "where are the things they've done? Where are their cities, their machines, their civilizations?"

"Perhaps," suggested Craig, "they outlived machines and cities millennia ago. Perhaps they've reached a stage of civilization where they don't need mechanical things."

He tapped the pencil on the desk. "Consider this. Those Candles are immortal. They'd have to be. There'd be nothing to kill them. They apparently have no bodies—just balls of energy. That's their answer to their environment. And you have the nerve to think of capturing some of them! You, who know nothing about them, plan to take them back to Earth to use as a circus attraction, a side-show drawing card—

something for fools to gape at!"

"People come out here to see them," Page countered. "Plenty of them. The tourist bureaus use them in their advertising."

"That's different," roared Craig. "If the Candles want to put on a show on home territory, there's nothing we can do about it. But you can't drag them away from here and show them off. That would spell trouble and plenty of it!"

"But if they're so damned intelligent," yelled Page, "why do they put on those shows at all? Just think of something and presto!—they're it. Greatest mimics in the Solar System. And they never get anything right. It's always cockeyed. That's the beauty of it."

"It's cockeyed," snapped Craig, "because man's brain never fashions a letter-perfect image. The Candles pattern themselves directly after the thoughts they pick up. When you think of something you don't give them all the details—your thoughts are sketchy. You can't blame the Candles for that. They pick up what you give them and fill in the rest as best they can. Therefore camels with flowing manes, camels with four and five humps, camels with horns, an endless parade of screwball camels, if camels are what you are thinking of."

He flung the pencil down angrily.

"And don't you kid yourself the Candles are doing it to amuse us. *More than likely they believe we are thinking up all those swell ideas just to please them.* They're having the time of their lives. Probably that's the only reason they've tolerated us here—because we have such amusing thoughts."

"When Man first came here they were just pretty, colored balls rolling around on the surface, and someone called them Roman Candles be-

cause that's what they looked like. But since that day they've been everything Man has ever thought of."

Page heaved himself out of the chair.

"I shall report your attitude to Washington, Captain Craig."

"Report and be damned," growled Craig. "Maybe you've forgotten where you are. You aren't back on Earth, where bribes and boot-licking and bulldozing will get a man almost anything he wants. You're at the power center on the Sunward side of Mercury. This is the main source of power for all the planets. Let this power plant fail, let the transmission beams be cut off and the Solar System goes to hell!"

He pounded the desk for emphasis.

"I'm in charge here, and when I say a thing it stands, for you as well as anyone. My job is to keep this plant going, keep the power pouring out to the planets. And I'm not letting some half-baked fool come out here and make me trouble. While I'm here, no one is going to stir up the Candles. We've got plenty of trouble without that."

Page edged toward the door, but Craig stopped him.

"Just a little word of warning," he said, speaking softly. "If I were you, I wouldn't try to sneak out any of the puddle jumpers, including your own. After each trip the oxygen tank is taken out and put into the charger, so it'll be at first capacity for the next trip. The charger is locked and there's just one key. And I have that."

He locked eyes with the man at the door and went on.

"There's a little oxygen left in the jumper, of course. Half an hour's supply, maybe. Possibly less. After that there isn't any more. It's not nice to be caught like that. They

found a fellow that had happened to just a day or so ago over near one of the Twilight Belt stations."

But Page was gone, slamming the door.

THE CANDLES had stopped dancing and were rolling around, drifting bubbles of every hue. Occasionally one would essay the formation of some object, but the attempt would be half-hearted and the Candle once more would revert to its natural sphere.

Old Creepy must have put his fiddle away, Craig thought. Probably he was making an inspection round, seeing if everything was all right. Although there was little chance that anything could go wrong. The plant was automatic, designed to run with the minimum of human attention.

The control room was a wonder of clicking, chuckling, chortling, snicking gadgets. Gadgets that kept the flow of power directed to the substations on the Twilight Belt. Gadgets that kept the tight beams from the substations centered exactly on those points in space where each must go to be picked up by the substations circling the outer planets.

Let one of those gadgets fail—let that spaceward beam sway as much as a fraction of a degree—Curt shuddered at the thought of a beam of terrific power smashing into a planet—perhaps into a city. But the mechanism had never failed—never would. It was foolproof. A far cry from the day when the plant had charged monstrous banks of converters to be carted to the outer worlds by lumbering spaceships.

This was really free power, easy power, plentiful power. Power carried across millions of miles on Addison's tight-beam principle. Free power to develop the farms of Venus,

the mines of Mars, the chemical plants and cold laboratories on Pluto.

Down there in the control room, too, were other gadgets as equally important. The atmosphere machine, for example, which kept the air mixture right, drawing on those tanks of liquid oxygen and nitrogen and other gases brought across space from Venus by the monthly oxygen ship. The refrigerating plant, the gravity machine, the water assembly.

Craig heard the crunch of Creepy's footsteps on the stairs and turned to the door as the old man shuffled into the room.

Creepy's brows were drawn down and his face looked like a thundercloud.

"What's the matter now?" asked Craig.

"By cracky," snapped Creepy, "you got to do something about that Rastus."

Craig grinned. "What's up this time?"

"He stole my last bottle of drinking liquor," wailed Creepy. "I was hoarding it for medical purposes, and now it's gone. He's the only one that could have taken it."

"I'll talk to Rastus," Craig promised.

"Some day," threatened Creepy, "I'm going to get my dander up and whale the everlastin' tar out of that smoke. That's the fifth bottle of liquor he's swiped off me."

The old man shook his head dolefully, whuffed his walruslike mustache.

"Aside from Rastus, how's everything else going?" asked Craig.

"Earth just rounded the Sun," the old man said. "The Venus station took up the load."

Craig nodded. That was routine. When one planet was cut off by the

Sun, the substations of the nearest planet took on an extra load, diverted part of it to the first planet's stations, carrying it until it was clear again.

He arose from the chair and walked to the port, stared out across the dusty plains. A dot was moving across the near horizon. A speedy dot, seeming to leap across the dead, gray wastes.

"Knut's coming!" he yelled to Creepy.

Creepy hobbled for the doorway. "I'll go down to meet him. Knut and me are having a game of checkers as soon as he gets in."

Craig laughed, relieved by Knut's appearance. "How many checker games have you and Knut played?" he asked.

"Hundreds of 'em," Creepy declared proudly. "He ain't no match for me, but he thinks he is. I let him beat me regular to keep the interest up. I'm afraid he'd quit playing if I beat him as often as I could."

He started for the door and then turned back. "But this is my turn to win." The old man chuckled in his mustache. "I'm goin' to give him a first-class whippin'."

"First," said Craig, "tell him I want to see him."

"Sure," said Creepy, "and don't you go telling him about me letting him beat me. That would make him sore."

CRAIG TRIED to sleep but couldn't. He was worried. Nothing definite, for there seemed no cause to worry. The tracer placed on the big warp revealed that it was moving slowly, a few feet an hour or so, in a direction away from the center. No other large ones had shown up in the detectors. Everything, for the moment, seemed under control. Just little things. Vague suspicions and

wonderings—snatches here and there that failed to fall into the pattern.

Knut, for instance. There wasn't anything wrong with Knut, of course, but while he had talked to him he had sensed something. An uneasy feeling that lifted the hair on the nape of his neck, made the skin prickle along his spine. Yet nothing one could lay one's hands on.

Page, too. The damn fool probably would try to sneak out and capture some Candles and then there'd be all hell to pay.

Funny, too, how Knut's radios, both in his suit and in the jumper, had gone dead. Blasted out, as if they had been raked by a surge of energy. Knut couldn't explain it, wouldn't try. Just shrugged his shoulders. Funny things always were happening on Mercury.

Craig gave up trying to sleep, slid his feet into slippers and walked across the room to the port. With a flip of his hand he raised the shutter and stared out.

Candles were rolling around. Suddenly one of them materialized into a monstrous whiskey bottle, lifted in the air, tilted, liquid pouring to the ground.

Craig chuckled. That would be either Old Creepy bemoaning the loss of that last bottle or Rastus sneaking off to where he'd hid it to take another nip.

A furtive tap came on the door, and Craig wheeled. For a tense moment he crouched, listening, as if expecting an attack. Then he laughed softly to himself. He was jumpy, and no fooling. Maybe what he needed was a drink.

Again the tap, more insistent, but still furtive.

"Come in," Craig called.

Old Creepy sidled into the room. "I hoped you wasn't asleep," he said.

"What is it, Creepy?" And even as he spoke, Craig felt himself going tense again. Nerves all shot to hell.

Creepy hitched forward.

"Knut," he whispered. "Knut beat me at checkers. Six times hand running! I didn't have a chance!"

Craig's laugh exploded in the room.

"But I could always beat him before," the old man insisted. "I even let him beat me every so often to keep him interested so he would play with me. And tonight I was all set to take him to a cleaning—"

Creepy's face twisted, his mustache quivering.

"And that ain't all, by cracky. I felt, somehow, that Knut had changed and—"

Craig walked close to the old man, grasped him by the shoulder. "I know," he said. "I know just how you felt." Again he was remembering how the hair had crawled upon his skull as he talked to Knut just a while ago.

Creepy nodded, pale eyes blinking, Adam's apple bobbing.

Craig spun on his heel, snatched up his shirt, started peeling off his pajama coat.

"Creepy," he rasped, "you go down to that control room. Get a gun and lock yourself in. Stay there until I get back. And don't let anyone come in!"

He fixed the old man with a stare. "You understand. *Don't let anyone get in!* Use your gun if you are forced to use it. *But see no one touches those controls!*"

Creepy's eyes bugged and he gulped. "Is there going to be trouble?" he quavered.

"I don't know," snapped Craig, "but I'm going to find out."

Down in the garage, Craig stared angrily at the empty stall.

Page's jumper was gone!

Grumbling with rage, Craig walked to the oxygen-tank rack. The lock was undamaged, and he inserted the key. The top snapped up and revealed the tanks—all of them, nestling in rows, still attached to the recharger lines. Almost unbelieving, Craig stood there, looking at the tanks.

All of them were there. That meant Page had started out in the jumper with insufficient oxygen. It meant the man would die out on the blistering wastes of Mercury. That he might go mad and leave his jumper and wander into the desert, a raving maniac, like the man they'd found out near the Twilight station.

Craig swung about, away from the tanks, and then stopped, thoughts spinning in his brain. There wasn't any use of hunting Page. The damn fool probably was dead by now. Sheer suicide, that was what it was. Sheer lunacy. And he had warned him, too!

And he, Craig, had work to do. Something had happened out there at the space warp. He had to lay those tantalizing suspicions that rummaged through his mind. There were some things he had to be sure about. He didn't have time to go hunting a man who was already dead, a damn fool who had committed suicide. The man was nuts to start with. Anyone who thought he could capture Candles—

Savagely, Craig closed one of the line valves, screwed shut the tank valve, disconnected the coupling and lifted the tank out of the rack. The tank was heavy. It had to be heavy to stand a pressure of two hundred atmospheres.

As he started for the jumper, Mathilde, the cat, strolled down the ramp from the floor above and walked between his legs. Craig

stumbled and almost fell, recovered his balance with a mighty effort and cursed Mathilde with a fluency born of practice.

"Me-ow-ow-ow," said Mathilde conversationally.

THERE IS something unreal about the Sunward side of Mercury, an abnormality that is sensed rather than seen.

There the Sun is nine times larger than seen from Earth, and the thermometer never registers under six hundred fifty degrees Fahrenheit. Under that terrific heat, accompanied by blasting radiations hurled out by the Sun, men must wear photocell space suits, must ride in photocell cars and live in the power center, which in itself is little more than a mighty photocell. For electric power can be disposed of, while heat and radiation often cannot be.

There the rock and soil have been crumbled into dust under the lashing of heat and radiations. There the horizon is near, always looming just ahead, like an ever-present brink.

But it is not these things that make the planet so alien. Rather, it is the strange distortion of lines, a distortion that one sometimes thinks he can see, but is never sure. Perhaps the very root of that alien sense is the fact that the Sun's mass makes a straight line an impossibility, a stress that bends magnetic fields and stirs up the very structure of space itself.

Curt Craig felt that strangeness of Mercury as he zoomed across the dusty plain. The puddle jumper splashed through a small molten pool, spraying it out in sizzling sheets. A pool of lead, or maybe tin.

But Craig scarcely noticed. At the back of his brain pounded a thousand half-formed questions. His

eyes, edged by crow's-feet, squinted through the filter shield, following the trail left by Knut's returning machine. The oxygen tank hissed softly and the atmosphere mixer chuckled. But all else was quiet.

A howl of terror and dismay shattered the quiet. Craig jerked the jumper to a stop, leaped from his seat, hand streaking to his gun.

Crawling from under the metal bunk bolted at the rear of the car was Rastus, the whites of his eyes showing like bull's-eyes.

"Good Lawd," he bellowed, "where is I?"

"You're in a jumper, sixty miles from the Center," snapped Craig. "What I want to know is how the hell you got here."

Rastus gulped and rose to his knees. "You see, it was like this, boss," he stammered. "I was lookin' for Mathilde. Dat cat, she run me wild. She sneaks into the refrigerator all the time. I jus' can't trust her no place. So when she turned up missin'—"

He struggled to his feet, and as he did so a bottle slipped from his pocket, smashed to bits on the metal floor. Pale-amber liquor ran among the fragments.

Craig eyed the shattered glass. "So you were hunting Mathilde, eh?"

Rastus slumped on the bunk, put his head in his hands. "Ain't no use lyin' to you, boss," he acknowledged. "Never gets away with it. I was havin' me a drink. Just a little nip. And I fell asleep."

"You hid the bottle you swiped from Creepy in the jumper," declared Craig flatly, "and you drank yourself to sleep."

"Can't seem to help it," Rastus moaned. "Ol' debbil's got me. Can't keep my hands off of a bottle, somehow. Ol' Mercury, he done dat to me. Ol' debbil planet. Nothin' as

it should be. Ol' Man Sun pullin' the innards out of space. Playin' around with things until they ain't the same—"

Craig nodded, almost sympathetically. That *was* the hell of it. Nothing ever was the same on Mercury. Because of the Sun's tremendous mass, light was bent, space was warped and eternally threatening to shift, basic law's required modification. The power of two magnets would not always be the same, the attraction between two electrical charges would be changed. And the worst of it was that a modification which stood one minute would not stand the next.

"Where are we goin' now, boss?"

"We're going out to the space warp that Knut found," said Craig. "And don't think for a minute I'll turn around and take you back. You got yourself into this, remember."

Rastus' eyes batted rapidly, and his tongue ran around his lips. "You said the warp, boss? Did I hear you right? The warp?"

Craig didn't answer. He swung back to his seat, started the jumper once again.

Rastus was staring out one of the side ports. "There's a Candle followin' us," he announced. "Big blue feller. Skippin' along right with us all the time."

"Nothing funny in that," said Craig. "They often follow us. Whole herds of them."

"Only one this time," said Rastus. "Big blue feller."

Craig glanced at the notation of the space warp's location. Only a few miles distant. He was almost there.

THERE WAS NOTHING to indicate what the warp might be, although the instruments picked it up and

charted it as he drew near. Perhaps if a man stood at just the right angle he might detect a certain shimmer, a certain strangeness, as if he were looking into a wavy mirror. But otherwise there probably would be nothing pointing to its presence. Hard to know just where one stopped or started. Hard to keep from walking into one, even with instruments.

Curt shivered as he thought of the spacemen who had walked into just such warps in the early days. Daring mariners of space who had ventured to land their ships on the Sunward side, had dared to take short excursions in their old-type space suit. Most of them had died, blasted by the radiations spewed out by the Sun, literally cooked to death. Others had walked across the plain and disappeared. They had walked into the warps and disappeared as if they had melted into thin air. Although, of course, there wasn't any air to melt into—hadn't been for many million years.

On this world, all free elements long ago had disappeared. Those elements that remained, except possibly far underground, were locked so stubbornly in combination that it was impossible to blast them free in any appreciable quantity. That was

why liquid air was carted clear from Venus.

The tracks in the dust and rubble made by Knut's machine were plainly visible, and Craig followed them. The jumper topped a slight rise and dipped into a slight depression. And in the center of the depression was a queer shifting of light and dark, as if one were looking into a tricky mirror.

That was the space warp!

Craig glanced at the instruments and caught his breath. Here was a space warp that was really big. Still following the tracks of Knut's machine, he crept down into the hollow, swinging closer and closer to that shifting, almost invisible blotch that marked the warp.

"Golly!" gasped Rastus, and Craig knew the Negro was beside him, for he felt his breath upon his neck.

Here Knut's machine had stopped, and here Knut had gotten out to carry the instruments nearer, the blotchy tracks of his space suit like furrows through the powdered soil. And there he had come back. And stopped and gone forward again. And there—

Craig jerked the jumper to a halt, stared in amazement and horror through the filter shield. Then, the breath sobbing in his throat, he



leaped from the seat, scrambled frantically for a space suit.

Outside the car, he approached the dark shape huddled on the ground. Slowly he moved nearer, the hands of fear clutching at his heart. Beside the shape he stopped and looked down. Heat and radiation had gotten in their work, shriveling, blasting, desiccating—but there could be no doubt.

Staring up at him from where it lay was the dead face of Knut Anderson!

CRAIG straightened up and looked around. Candles danced upon the ridges, swirling and jostling, silent watchers of his grim discovery. The one lone blue Candle, bigger than the rest, had followed the machine into the hollow, was only a few rods away, rolling restlessly to and fro.

Knut had said something was funny—had shouted it, his voice raspy and battered by the screaming of powerful radiations. Or had that been Knut? Had Knut already died when that message came through?

Craig glanced back at the sand, the blood pounding in his temples. Had the Candles been responsible for this? And if they were, why was he unmolested, with hundreds dancing on the ridge?

And if this was Knut, with dead eyes staring at the black of space, who was the other one—the one who came back?

Candles masquerading as human beings? Was that possible? Mimics the Candles were—but hardly as good as that. There was always something wrong with their mimicry—something ludicrously wrong.

He remembered now the look in the eyes of the returned Knut—that chilly, deadly look—the kind of look one sometimes sees in the eyes of

ruthless men. A look that had sent cold chills chasing up his spine.

And Knut, who was no match for Creepy at checkers, but who thought he was because Creepy let him win at regular intervals, had taken six games straight.

Craig looked back at the jumper again, saw the frightened face of Rastus pressed against the filter shield. The Candles still danced upon the hills, but the big blue one was gone.

Some subtle warning, a nasty little feeling between his shoulder blades, made Craig spin around to face the warp. Just in front of the warp stood a man, and for a moment Craig stared at him, frozen, speechless, unable to move.

*For the man who stood in front of him, not more than forty feet away, was Curt Craig!*

Feature for feature, line for line, that man was himself. A second Curt Craig. As if he had rounded a corner and met himself coming back.

Bewilderment roared through Craig's brain, a baffling bewilderment. He took a quick step forward, then stopped. For the bewilderment suddenly was edged with fear, a knifelike sense of danger.

The man raised a hand and beckoned, but Craig stayed rooted where he stood, tried to reason with his muddled brain. It wasn't a reflection, for if it had been a reflection it would have shown him in a space suit, and this man stood without a space suit. And if it were a real man, it wouldn't be standing there exposed to the madness of the Sun. Such a thing would have spelled sure and sudden death.

Forty feet away—and yet within that forty feet, perhaps very close, the power of the warp might reach out, might entangle any man who

crossed that unseen deadline. The warp was moving, at a few feet an hour, and this spot where he now stood, with Knut's dead body at his feet, had a few short hours ago been within the limit of the warp's influence.

The man stepped forward, and as he did, Craig stepped back, his hands dropping to the gun butts. But with the guns half out he stopped, for the man had disappeared. Had simply vanished. There had been no puff of smoke, no preliminary shimmering as of matter breaking down. The man just simply wasn't there. But in his place was the big blue Candle, rocking to and fro.

Cold sweat broke out upon Craig's forehead and trickled down his face. For he knew he had trodden very close to death—perhaps to something even worse than death. Wildly he swung about, raced for the puddle jumper, wrenched the door open, hurled himself at the controls.

Rastus waited at him. "What's the matter, boss?"

"We have to get back to the center," yelled Craig. "Old Creepy is back there all alone! Lord knows what has happened to him—what will happen to him."

"But, boss," yipped Rastus, "what's the matter. Who was back there on the ground?"

"That was Knut," said Craig.

"But Mr. Knut is back there at the center, boss. I know. I seen him with my own eyes."

"Knut isn't at the center," Craig snapped. "Knut is dead out there by the warp. The thing that's at the center is a Candle, masquerading as Knut!"

CRAIG DROVE like a madman, the cold claws of fear hovering over him.

Twice he almost met disaster, once when the jumper bucked through a deep drift of dust, again when it rocketed through a pool of molten tin.

"But them Candles can't do that nohow," argued Rastus. "They can't get nothing right. Every time they try to be a thing they always get it wrong."

"How do you know that?" snapped Craig. "How do you know they couldn't if they tried? And if they could and wanted to use it against us, do you think they would let us see them do it? Through all these years they have done their best to make us lower our guard. They have tried to make us believe they were nothing but a gang of good-natured clowns. That, my boy, is super-plus psychology."

"But why?" demanded Rastus. "Why would they want to do it? We ain't never hurt them."

"Ask me another one," said Craig grimly. "The best answer is that we don't know them. They might have a dozen reasons—reasons we couldn't understand. Reasons no human being could understand because they wouldn't tally with the things we know."

Craig gripped the wheel hard and slammed the jumper up an incline slippery with dust.

Damn it, the thing that had come back as Knut was Knut. It knew the things Knut knew, it acted like Knut. It had his mannerisms, it talked in his voice, it actually seemed to think the way Knut would think.

What could a man—what could mankind do against a thing like that? How could it separate the original from the duplicate? How would it know its own?

The thing that had come back to

the Center had beaten Creepy at checkers. Creepy had led Knut to believe he was the old man's equal at the game, although Creepy knew he could beat Knut at any time he chose. But Knut didn't know that—and the thing masquerading as Knut didn't know it. So it had sat down and beaten Creepy six games hand-running, to the old man's horror and dismay.

Did that mean anything or not?

Craig groaned and tried to get another ounce of speed out of the jumper.

"It was that old blue jigger," said Rastus. "He was sashaying all around, and then he disappeared."

Craig nodded. "He was in the warp. Apparently the Candles are able to alter their electronic structures so they may exist within the warp. They lured Knut into the warp by posing as human beings, arousing his curiosity, and when he stepped into its influence it opened the way for their attack. They can't get at us inside a suit, you see, because a suit is a photocell, and they are energy, and in a game of that sort, the cell wins every time.

"That's what they tried to do with me. Lord knows what the warp would have done if I'd stepped into it, but undoubtedly it would have made me vulnerable in the fourth dimension or in some other way. That would have been all they needed."

Rastus' eyes strayed to the litter of glass on the floor by the bunk. "Sho' wish I had me a snort of red-eye," he mourned. "Sho' could do with a little stimulus."

"It was clever of them," Craig said. "A Trojan horse method of attack. First they got Knut, and next they tried to get me, and with two of them in the Center it would

not have been so hard to have gotten you and Creepy."

He slapped the wheel a vicious stroke, venting his anger.

"And the beauty of it was that no one would have known. The oxygen ship could have come from Venus and the men on board would never have been the wiser, for they would have met things that seemed like all four of us. No one would have guessed. They would have had time—plenty of time—to do anything they planned."

"What you figure they was aimin' to do, boss?" queried Rastus. "Figure maybe they meant to blow up that ol' plant?"

"I don't know, Rastus. How could I know? If they were human beings, I could make a guess, because I could put myself in their shoes and try to think the way they did. But with the Candles you can't do that. You can't do anything with the Candles, because you don't know what they are."

"You aimin' to raise hell with dem Candles, boss?"

"With what?" snapped Craig.

"Just give me a razor," exulted Rastus. "Maybe two razors, one for each han'. I'se a powerful dangerous man with a razor blade."

"It'll take more than razors," said Craig. "More than our energy guns, for those things are energy. We could blast them with everything we had, and they'd just soak it up and laugh at us and ask for more."

He skidded the jumper around a ravine head, slashed across the desert. "First thing," he declared, "is to find the one that's masquerading as Knut. Find him and then figure out what to do with him."

BUT FINDING the Knut Candle was easier said than done. Craig, Creepy

and Rastus, clad in space suits, stood in the kitchen at the center.

"By cracky," said Creepy, "he must be here somewhere. He must have found him an extra-special hide-out that we have overlooked."

Craig shook his head. "We haven't overlooked him, Creepy. We've searched this place from stem to stern. There isn't a crack where he could hide."

"Maybe," suggested Creepy, "he figured the jig was up and took it on the lam. Maybe he scrambled out the lock when I was up there guarding that control room."

"Maybe," agreed Craig. "I had been thinking of that. He smashed the radio—that much we know. He was afraid that we might call for help, and that means he may have had a plan. Even now he may be carrying out that plan."

The Center was silent, filled with those tiny sounds that only serve to emphasize and deepen a silence. The faint *cluck-cluck* of the machines on the floor below, the hissing and distant chortling of the atmosphere mixer, the chuckling of the water synthesizer.

"Dang him," snorted Creepy, "I knew he couldn't do it. I knew Knut couldn't beat me at checkers honest—"

From the refrigerator came a frantic sound. "Me-ow—me-ow-ow-ow," it wailed.

Rastus leaped for the refrigerator door, grabbing a broom as he went. "It's that Mathilde cat again," he yelled. "She's always sneakin' in on me. Every time my back is turned."

He brandished the broom and addressed the door. "You jus' wait. I'll sure work you over with this here broom. I'll plaster you—"

But Craig had leaped forward, snatched the Negro's hand away

from the door lever. "Wait!" he shouted.

Mathilde yodeled pitifully.

"But, boss, that Mathilde cat—"

"Maybe it isn't Mathilde," Craig rasped grimly.

From the doorway leading out into the corridor came a low purring rumble. The three men whirled about. Mathilde was standing across the threshold, rubbing with arched back against the jamb, plumed tail waving. From inside the refrigerator came a scream of savage feline fury.

Rastus' eyes were popping and the broom clattered to the floor. "But, boss," he shrieked, "there's only one Mathilde!"

"Of course, there's only one Mathilde," snapped Craig. "One of these is her. The other is Knut, or the thing that was Knut."

The lock signal rang shrilly, and Craig stepped swiftly to a port, flipped the shutter up.

"It's Page," he shouted. "Page is back again!"

He turned from the port, face twisted in disbelief. Page had gone out five hours before—without oxygen. Yet here he was, back again. No man could live for over four hours without oxygen.

Craig's eyes hardened, and frowns came between his brows. "Creepy," he said suddenly, "you open the inner lock. You, Rastus, pick up that cat. Don't let her get away."

Rastus backed off, eyes wide in terror.

"Pick her up," commanded Craig sharply. "Hang onto her."

"But, boss, she—"

"Pick her up, I say!"

Creepy was shuffling down the ramp to the lock. Slowly Rastus moved forward, clumsily reached down and scooped up Mathilde.

Mathilde purred loudly, dabbing at his suit-clad fingers with dainty paws.

PAGE STEPPED out of the jumper and strode across the garage toward Craig, his boot heels ringing on the floor.

From behind the space-suit visor, Craig regarded him angrily. "You disobeyed my orders," he snapped. "You went out and caught some Candles."

"Nothing to it, Captain Craig," said Page. "Docile as so many kittens. Make splendid pets."

He whistled sharply, and from the open door of the jumper rolled three Candles, a red one, a green one, a yellow one. Ranged in a row, they lay just outside the jumper, rolling back and forth.

Craig regarded them appraisingly. "Cute little devils," said Page good-naturedly.

"And just the right number," said Craig.

Page started, but quickly regained his composure. "Yes, I think so, too. I'll teach them a routine, of course, but I suppose the audience reactions will bust that all to hell once they get on the stage."

Craig moved to the rack of oxygen tanks and snapped up the lid.

"There's just one thing I can't understand," he said. "I warned you you couldn't get into this rack. And I warned you that without oxygen you'd die. And yet here you are."

Page laughed. "I had some oxygen hid out, captain. I anticipated something just like that."

Craig lifted one of the tanks from the rack, held it in his arms. "You're a liar, Page," he said calmly. "You didn't have any other oxygen. You didn't need any. A man would die if he went out there without oxygen—die horribly. But you wouldn't—because you aren't a man!"

Page stepped swiftly back, but Craig cried out warningly. Page stopped, as if frozen to the floor, his eyes on the oxygen tank. Craig's finger grasped the valve control.

"One move out of you," he warned grimly, "and I'll let you have it. You know what it is, of course. Liquid oxygen, pressure of two hundred atmospheres. Colder than the hinges of space."

Craig grinned ferociously. "A dose of that would play hell with your metabolism, wouldn't it? Tough enough to keep going here in the dome. You Candles have lived out there on the surface too long. You need a lot of energy, and there isn't much energy here. We have to

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screen it out or we would die ourselves. And there's a damn sight less energy in liquid oxygen. You met your own environment, all right; you even spread that environment pretty wide, but there's a limit to it."

"You'd be talking a different tune," Page declared bitterly, "if it weren't for those space suits."

"Sort of crossed you up, didn't they," said Craig. "We're wearing them because we were tracking down a pal of yours. I think he's in the refrigerator."

"A pal of mine—in a refrigerator?"

"He's the one that came back as Knut," said Craig, "and he turned into Mathilde when he knew we were hunting for him. But he did the job too well. He was almost more Mathilde than he was Candle. So he sneaked into the refrigerator. And he doesn't like it."

Page's shoulders sagged. For a moment his features seemed to blur, then snapped back into rigid lines again.

"The answer is that you do the job too well," said Craig. "Right now you yourself are more Page than Candle, more man than thing of energy."

"We shouldn't have tried it," said Page. "We should have waited until there was someone in your place. You were too frank in your opinion of us. You held none of the amused contempt so many of the others held. I told them they should wait, but a man named Page got caught in a space warp—"

Craig nodded. "I understand. An opportunity you simply couldn't miss. Ordinarily we're pretty hard to get at. You can't fight photocells. But you should strive for more convincing stories. That yarn of yours about capturing Candles—"

"But Page came out for that purpose," insisted the pseudo Page. "Of course, he would have failed. But, after all, it was poetic justice."

"It was clever of you," Craig said softly. "More clever than you thought. Bringing your side-kicks in here, pretending you had captured them, waiting until we were off our guard."

"Look," said Page, "we know when we are licked. What are you going to do?"

"We'll turn loose the one in the refrigerator," Craig told him. "Then we'll open up the locks and you can go."

"And if we don't want to go?"

"We'd turn loose the liquid oxygen," said Craig. "We have vats of the stuff upstairs. We can close off this room, you know, turn it into a howling hell. You couldn't live through it. You'd starve for energy."

FROM THE KITCHEN came a hideous uproar, a sound that suggested a roll of barbed wire galloping around a tin roof. The bedlam was punctuated by yelps and howls from Rastus.

Creepy, who had been standing by the lock, started forward, but Craig, never lifting an eye from Page, waved him back.

Down the ramp from the kitchen came a swirling ball of fur, and after it came Rastus, whaling lustily with his broom. The ball of fur separated, became two identical cats, tails five times normal size, backs bristling, eyes glowing with green fury.

"Boss, I jus' got tired of holding Mathilde—" Rastus panted.

"I know," said Craig. "So you chucked her into the refrigerator with the other cat."

"I sho' did," confessed Rastus, "and hell busted loose right underneath my nose."

"All right," snapped Craig. "Now, Page, if you'll tell us which one of those is yours—"

Page spoke sharply and one of the cats melted and flowed. Its outlines blurred and it became a Candle, a tiny, pale-pink Candle.

Mathilde let out one soul-wrenching shriek and fled.

"Page," said Craig, "we've never wanted trouble. If you are willing, we'd like to be your friends. Isn't there some way?"

Page shook his head. "No, captain. We're poles apart. I and you have talked here, but we've talked as man to man rather than as a man and a person of my race. Our differences are too great, our minds too far apart."

He hesitated, almost stammering. "You're a good egg, Craig. You should have been a Candle."

"Creepy," said Craig, "open up the lock."

Page turned to go, but Craig called him back. "Just one thing more. A personal favor. Could you tell me what's at the bottom of this?"

"It's hard to explain," said Page. "You see, my friend, it's a matter of culture. That isn't exactly the word, but it's the nearest I can express it in your language."

"Before you came we had a culture, a way of life, a way of thought, that was distinctly our own. We didn't develop the way you developed, we missed this crude, preliminary civilization you are passing through. We started at a point you won't reach for another million years."

"We had a goal, an ideal, a place we were heading for. And we were making progress. I can't explain it,

for—well, there just are no words for it. And then you came along—"

"I think I know," said Craig. "We are a disturbing influence. We have upset your culture, your way of thought. Our thoughts intrude upon you and you see your civilization turning into a troupe of mimics, absorbing alien ideas, alien ways."

He stared at Page. "But isn't there a way? Damn it, do we have to fight about this?"

But even as he spoke, he knew there was no way. The long role of Terrestrial history recorded hundreds of such wars as this—wars fought over forms of faith, over terminology of religion, over ideologies, over cultures. And the ones who fought those wars were members of the same race—not members of two races separated by different origins, by different metabolisms, by different minds.

"No," he said, "there is no way. Some day, perhaps, we will be gone. Some day we will find another and a cheaper source of power and you will be left in peace. Until that day—" He left the words unspoken.

Page turned away, headed for the lock, followed by the three big Candles and the little pink one.

Ranged together at the port, the three Terrestrials watched the Candles come out of the lock. Page was still in the form of a man, but as he walked away the form ran together and puddled down until he was a sphere.

Creepy cackled at Craig's elbow. "By cracky," he yelped, "he was a purple one!"

CRAIG sat at his desk, writing his report to the Solar power board, his pen traveling rapidly over the paper:

—they waited for five hundred years before they acted. Perhaps this was merely

caution or in the hope they might find a better way. Or it may be that time has a different value for them than it has for us. In an existence which stretches into eternity, time would have but little value.

For all those five hundred years they have watched and studied us. They have read our minds, absorbed our thoughts, dug out our knowledge, soaked up our personalities. Perhaps they know us better than we know ourselves. Whether their crude mimicry of our thoughts is merely a clever ruse to make us think they are harmless or whether it reflects differing degrees of the art of mimicry—the difference between a cartoon and a masterpiece of painting—I cannot say. I cannot even guess.

Heretofore we have never given thought to protect ourselves against them, for we have considered them, in general, as amusing entities and little else. Whether or not the cat in the refrigerator was the Candle or Mathilde I do not know, but it was the cat in the refrigerator that gave me the idea of using liquid oxygen. Undoubtedly there are better ways. Anything that would swiftly deprive them of energy would serve. Convinced they will try again, even if they have to wait another five hundred years, I urgently suggest—

He stopped and laid down the pen.

From the kitchen below came the faint clatter of pots and pans as Rastus engineered a dinner. Bellowed snatches of unmusical song, sandwiched between the clatter of utensils, floated up the ramp:

*"Chicken in de bread pan,  
Kickin' up de dough—"*

The wastebasket in the corner moved slightly and Mathilde slunk out, tail at half mast. With a look of contempt at Craig, she stalked to the door and down the ramp.

Creepy was tuning up his fiddle, but only half-heartedly. Creepy felt badly about Knut. Despite their checker arguments, the two had been good friends.

Craig considered the things he'd have to do. He'd have to go out and bring in Knut's body, ship it back to

Earth for burial. But first he was going to sleep. Lord, how he needed sleep!

He picked up the pen and proceeded with his writing:

—that every effort be bent to the development of some convenient weapon to be used against them. But to be used only in defense. A program of extermination, such as has been carried out on other planets, is unthinkable.

To do this it will be necessary that we study them even as they have studied us. Before we can fight them we must know them. For the next time their method of attack undoubtedly will be different.

Likewise we must develop a test, to be applied to every person before entering the Center, that will reveal whether he is a Candle or a man.

And, lastly, every effort should be made to develop some other source of universal power against the day when Mercury may become inaccessible to us.

He reread the report and put it down.

"They won't like that," he told himself. "Especially that last paragraph. But we have to face the truth."

Rastus' voice rose shrilly. "You, Mathilde! You get out of there! Can't turn my back but you're in that icebox—"

A broom thudded with a whack.

There was no sound from the control room. Creepy apparently had put away his fiddle. Probably didn't have the heart to play it.

For a long time Craig sat at his desk, thinking. Then he arose and went to the port.

Outside, on the bitter plains of Mercury, the Candles had paired off, two and two, were monstrous dice, rolling in the dust. As far as the eye could see, the plains were filled with galloping dominos.

And every pair, at every toss, were rolling sevens!



## POKER FACE

By Theodore Sturgeon

***"Face" was a remarkable poker player. Even more remarkable than his fellow players thought. It wasn't just the way he stacked decks—***

Illustrated by R. Isip

WE all had to get up early that morning, and we still hadn't sense enough to get up from around that poker table. We'd called in that

funny little guy from the accounting department they called Face to make a foursome with the three of us. It had been nip and tuck

from nine o'clock on—he played a nice game of stud. By one in the morning we had all lost six weeks' pay and won it back again, one, two bucks more or less, and all of us were a little reluctant to go in the hole. We had a two-bit straight bet—a nice way for the lucky man to clean up quickly so that everyone could go home. But tonight there was no one lucky man, and when Harry jokingly bet a nickel on a pair of fours and Delehanty took him up on it, the game degenerated into penny-ante. After a while we forgot whose deal it was and sat around just batting the breeze.

"Screwy game," said Delehanty. "What's the use of squattin' here all this time just to break even? Must be your influence, Face. Never happened before. We generally hand all our money over to Jack here after four deals. Hey, Jack?"

I grinned. "The game still owes me plenty, bud," I said. "But I think you're right about Face. I don't know if you noticed it, but damn if that winning didn't go right around behind the deal—me, you, Face, Harry, me again. If I won two, everyone else would win two."

Face raised an eyebrow ridge because he hadn't any eyebrows. There wasn't anything particularly remarkable about his features except that they were absolutely without hair. The others carried an a. m. stubble, but his face gleamed nakedly, half luminous. He'd been a last choice, but a pretty good one. He said little, watched everyone closely and casually, and seemed like a pretty nice guy. "Noticed that, did you?" he asked. His voice was a very full tenor.

"That's right," said Harry. "How's about it, Face? What is this power you have over poker?"

"Oh, just one of those things you pick up," he said.

Delehanty laughed outright. "Listen at that," he said. "He's like the ol' mountain climber who saw a volcano erupting in the range he'd scaled the day before. 'By damn,' he says, 'why can't I be careful where I spit?'"

Everybody laughed but Face. "You think it just happened? Would you like to see it happen again?"

That stopped the hilarity. We looked at him queerly. Harry said, "What's the dope?"

"Play with chips," said Face. "No money, no hard feelings. If you like, I won't touch the cards. Just to make it easy, I'll put it this way. Deal out four hands of stud. Jack'll win the first with three threes. Delehanty next with three fours. Me next with three fives. Harry next with three sixes. Each three-spread will come out hearts, diamonds, clubs, in that order. You, Delehanty, start the deal. Go on—shuffle them all you like."

Delehanty was a little popeyed. "You wouldn't want to make a little bet on that, would you?" he breathed.

"I would not. I don't want to take your money that way. It would be like picking pockets."

"You're bats, Face," I said. "There's so little chance of a shuffled deck coming out that way that you might as well call it impossible."

"Try it," said Face quietly.

DELEHANTY counted the cards carefully, shuffled at least fifteen times with his very efficient gambler's riffle, and dealt around quickly. The cards flapped down in front of me—a jack face down, a six, and then—three threes; hearts, diamonds, clubs, in that order. No—

body said anything for a long time.

Finally, "Jack's got it," Harry breathed.

"Let me see that deck," snapped Harry. He swept it up, spread it out in his hands. "Seems O. K.," he said slowly, and turned to Face.

"Your deal," said Face woodenly.

Harry dealt quickly. I said, "Delehanty's s'posed to be next with three fours—right?" Yeah—right! Three fours lay in front of Delehanty. It was too much—cards shouldn't act that way. Wordlessly I reached for the cards, gathered them up, pitched them back over my shoulder. "Break out a new deck," I said. "Your deal, Face."

"Let Delehanty deal for me," said Face.

Delehanty dealt again, clumsily this time, for his hands trembled. That didn't matter—there were still three fives smiling up at Face when he was through.

"Your deal," whispered Harry to me, and turned half away from the table.

I took up the cards. I spent three solid minutes shuffling them. I had Harry cut them and then cut them again myself and then passed them to Delehanty for another cut. I dealt four hands, and Harry's was the winning hand, with three sixes—hearts, diamonds, clubs.

Delehanty's eyes were almost as big now as his ears. He said, "Heaven. All. Might. Tea." and rested his chin in his hands. I thought I was going to cry or something.

"Well?" said Face.

"Were we playing poker with this guy?" Harry asked no one in particular.

When, by a great deal of hard searching, I found my voice again, I asked Face, "Hey, do you do that just any time you feel like it, or does

it come over you at odd moments?"

Face laughed. "Any time," he said. "Want to see a really pretty one? Shuffle and deal out thirteen cards to each of us, face down. Then look them over."

I gave him a long look and began to shuffle. Then I dealt. I think we were all a little afraid to pick up our cards. I know that when I looked at mine I felt as if someone had belted me in the teeth with a night stick. I had thirteen cards, and they were all spades. I looked around the table. Delehanty had diamonds. Face had hearts. Harry had clubs.

You could have heard a bedbug sneeze in the room until Harry began saying, "Ah, no. Ah, no. Ah, no," quietly, over and over, as if he were trying to tell himself something.

"Can they all do things like that where you come from?" I asked, and Face nodded brightly.

"Can everyone walk where you come from?" he returned. "Or see, or hear, or think? Sure."

"Just where do you come from?" asked Harry.

"I don't know," said Face. "I only know how I came, and I couldn't explain that to you."

"Why not?"

"How could you explain an internal-combustion engine to an Australian bushman?"

"You might try," said Delehanty, piqued. "We's pretty smart bushmen, we is."

"Yeah," I chimed in. "I'm willing to allow you the brains to do those card tricks of yours; you ought to have enough savvy to put over an idea or two."

"Oh—the cards. That was easy enough. I felt the cards as you shuffled them."

"You felt with my fingers?"

"That's right. Want proof? Jack, your head is itching a little on the right side, near the top, and you're too lazy to scratch it just yet. Harry's got a nail pushing into the third toe of his right foot—not very bad, but, it's there. Well, what do you say?"

He was right. I scratched. Harry shuffled his feet and said, "O. K., but what has that got to do with arranging the cards that way? Suppose you did feel them with our hands—then what?"

FACE put his elbows on the table. "I can feel so well with your senses that I can catch sensations far too light for you to recognize. Ever see a gnat crawling on the back of your hand so lightly that you yourself couldn't feel it? Well, I could. I can feel better with your fingers than you can yourself! As for arranging the cards, that was done in the shuffle. You grasp half of the deck in each hand, bend them, let them flip out from under your thumbs. If you can control the pressure of each thumb carefully enough, you can make the right cards fall into the right places. You all shuffled at least four times; that made it that much easier for me."

Delehanty was popeyed again. "How did you know which cards were supposed to go in which places?"

"Memorized their order, of course," said Face. "I've seen that done in theaters even by men like you."

"So've I," said Harry. "But you still haven't told us how you arranged the deal. If you'd done the shuffling I could see it, but—"

"But I *did* do the shuffling," said Face. "I controlled that pressure of your thumbs."

"How about the cuts?" Delehanty

put in, feeling that at last we had him on the run. "When Jack dealt he handed the pack to Harry and me both to be cut."

"I not only controlled those cuts," said Face calmly, "but I made you do it."

"Go way," said Delehanty aggressively. "Don't give us that. How're you going to make a man do anything you like?"

"Skeptical animal, aren't you?" grinned Face; and Delehanty rose slowly, walked around the table, caught Harry by the shoulders and kissed him on both cheeks. Harry almost fell off his chair. Delehanty stood there rockily, his eyes positively bulging. Suddenly he expectorated with great violence. "What the dirty so and forth made me do that?" he wanted to know.

"Chummy, ain't you?" grinned Harry through his surprise.

Face said, "Satisfied, Delehanty?"

Delehanty whirled on him. "Why, you little—" His fury switched off like a light going out. "Right again, Face." He went over and sat down. I never saw that Irishman back down like that before.

"You made him do that?" I asked.

Face regarded me gravely. "You doubt it?"

We locked glances for a moment, and then my feet gathered under me. I had a perverse desire to get down on all fours and bark like a dog. It seemed the most natural thing in the world. I said quickly, "Not at all, Face, not at all!" My feet relaxed.

"You're the damndest fellow I ever saw," said Harry. "What kind of a man are you, anyway?"

"Just a plain ordinary man with a job," said Face, and looked at Delehanty.

"So am I," said Harry, "but I can't make cards sit up and type-write, or big, dumb Irishers snuggle up to their fellowmen."

"Don't let that bother you," said Face. "I told you before—there's nothing more remarkable in that than there is in walking, or seeing, or hearing. I was born with it, that's all."

"You said everyone was, where you come from," Harry reminded him. "Now spill it. Just where did you come from?"

"Geographically," said Face, "not very far from here. Chronologically, a hell of a way."

Harry looked over my way blankly. "Now what does all that mean?"

"As near as I can figure out," said Face, "it means just what I said. I come from right around here—fifty miles, maybe—but the place I came from is thirty-odd thousand years away."

"Years away?" I asked, by this time incapable of being surprised. "You mean 'ago,' don't you?"

"Away," repeated Face. "I came along duration, not through time itself."

"Sounds very nice," murmured Delehanty to a royal flush he had thumbed out for himself.

FACE laughed. "Duration isn't time—it parallels it. Duration is a dimension. A dimension is essentially a measurement along a plane of existence. By that I mean that any given object has four dimensions, and these extend finitely along four planes—length, width, height, duration. The last is no different from the others; nor is it any less tangible. You simply take it for granted."

When you're ordering a piece of lumber, for instance, you name its measurements. You say you want a two by six, twelve feet long. You don't order its duration; you simply take for granted that it will extend long enough in that dimension to suit your needs. You would build better if you measured it as carefully as you do the others, but your life span is too short for you to care that much."

"I think I savvy that," said Harry, who had been following carefully, "but what do you mean by saying that you came 'along' duration?"

"Again, just what I said. You can't move without moving along the plane of a dimension. If you walk down the street, you move along its length. If you go up in an elevator, you move along its



height. I came along duration."

"You mean you projected yourself into the fourth dimension?" asked Harry.

"No!" Face said violently, and snorted. "I told you—duration is a dimension, not another set of dimensions. Can you project yourself into length, or height, or into any one dimension? Of course not! The four are interdependent. That fourth-dimensional stuff you read is poppycock. There's no mystery about the fourth dimension. It isn't an impalpable world. It's a basis of measurement."

I said, "What's this business of your traveling along it?"

Face spread out his hands. "As I said before, duration is finite. Suppose you wanted to walk from Third Street to Fifth Street. First you'd locate a sidewalk that would take you in the direction you were going. You'd follow that until it ended. Then you'd locate one that would take you from there to your destination. Where the one stopped and the other started is Fourth Street. Now, if you want to go twenty blocks instead of two, you simply repeat that process until you get where you're going.

"Traveling along duration is exactly the same thing. Just as you enter a street at a certain point in its length, so you encounter an object on the street at a certain point in its duration. Maybe it's near the beginning, maybe near the end. You follow it along that dimension—you don't project yourself into it. All objects have two terminations in duration—inception and destruction. You travel along an object's duration until it ceases to exist beside you because you have reached the end of it—or the beginning. Then you proceed to find another object so that you may continue in

the same direction, exactly as you proceeded to find yourself another sidewalk in your little trek across town."

"I'll be damned," said Delehanty, "I can understand it!"

"Me, too," Harry said. "That much of it. But exactly how did you travel along duration? I can get the idea of walking beside a building's length, for instance, but I can't see myself walking along beside . . . er . . . how long it lasted, if you see what I mean. Or do I see what I mean?"

"Now you're getting to something that may be a little tough to explain," said Face. "You have few expressions in your language that could cover it. About the clearest way for me to put it is this: My ability to travel in that particular direction is the result of my ability to perceive it. If you could only perceive two dimensions, length and breadth, you would be completely in the dark about the source of an object which dropped on you from above. If you couldn't sense the distance from here to the door—if you didn't know the door existed, nor the distance to it, you wouldn't be able to make the trip. I can see along duration as readily as you can see up and down a road. I can move along it equally readily."

"Do you stay in one place while you travel duration?" I asked suddenly.

"I can. I don't have to, though. You can go forward and upward while you curve to the left, can't you? Mix 'em any way you like."

Harry piped up. "You say you came thirty thousand years. How is that possible? You don't look as if you're much older than I am."

"I'm not," said Face, "in point of years existed. That is, I didn't live those years. I—passed them."

"How long did it take you?"

Face smiled. "Your question is ridiculous, Harry. 'How long' is a 'durational' term. It involves passage of time, which is a convenient falsehood. Time is static, objects mobile. I can't explain a true state of affair from the basis of a false conception."

HARRY shut up. I asked him something that had been bothering me. "Where did you come from, Face, and—why?"

He looked at me deeply, that eyebrow ridge rising a trifle. "I came—I was sent. I came because I was qualified for the job. I was sent because—well, someone had to be sent, to restore the balance of the city."

"What city?"

"I don't know. It had a name, I suppose, but it was forgotten. There was no need for a name. Do you name your toothbrush, or your bed sheets, or anything else that has been nearly part of you all your life? No one ever left the city, no one ever arrived at it. There were other cities, but no one cared about them, where they were, who their people were and what they were like, and so on. There was no need to know. The city was independent and utterly self-sufficient. It was the ultimate government. It was not a democracy, for each individual was subjugated entirely to the city. But it was not a dictatorship as you know the term, for it had no dictators. It had no governing body, as a matter of fact. It didn't need one. It had no laws but those of habit and custom. It ran smoothly because all of its internal frictions had been worn smooth by the action of centuries. It was an anarchistic society in the true sense of anarchism

—society without need of government."

"That's an impossibility," said Harry, who had a reputation as a minor barroom sociologist.

"I came from that city," Face reminded him gently. "Why is it impossible? You must take certain things into account before you make such rash statements. Your human nature is against such an organization. Your people would be like lost sheep—possibly like lost wolverines—under such a set-up. But my people were not like that—not after centuries of breeding for the most desirable traits, living circumscribed ways of life, thinking stereotyped thoughts. Imagine it if you can—let me describe the life of an individual to you.

"He was born when he was needed. He was an individual from a mold. He was a certain weight, not the thousandth of a gram more or less than that of any of his contemporaries. He was fed the same food as they, slept exactly the same hours, learned precisely the same things at the same time. His pulse, mental powers, rate of metabolism, physical strength, range of vision—all were exactly the same as those of the same age. He needed no individual attention. He fought no disease, because there was no disease in the city. He was fed and clothed and housed by machines, and he was taught by them and quickly learned the way of them. When he was adult he was bred. When he was eighteen he had been schooled for two hours a day for eight years. He then spent one year working two hours a day tending one of the millions of machines that took their power from interstellar space and transmuted it into usable energies for the people and the structures. When he had finished that year he

spent an hour each day for eight months in teaching the young the things he had observed about the work he had done. He gave instruction for twenty days less each year for twelve years and then died because he ceased to get fed, as there was nothing left for him to do. His body was transformed into raw materials of various kinds, with no waste. There was never any waste in the city.

"Now the city was divided into two halves, like the halves of a great brain. One half was dedicated to the supply of power, and one to materials. There were forty-five million people in each half, equally divided in age and sex. The flawless smoothness of the city's operation depended on the maintenance of that exact balance between supply and demand, manufacture and the means to manufacture. For every death there was a birth; for every loss there was a gain or an equal loss on the other side. The equation was kept balanced, the scales level. The city was permanent, inexorable, immortal and static."

"What did they do with their spare time?" asked Harry.

"They lay in their cubicles until they were needed."

"Were there no theaters, ball games—nothing like that?" asked Delehanty.

Face shook his head. "Amusement is for the relaxation of an imperfect mind," he said. "A mind that has been trained to do one thing and one thing only needs no stimulation or change of pace. Remember—it wasn't only that these people were educated that way and brought up in those surroundings. They were bred for those traits."

"Why was the city so big?" asked Harry. "Good gosh, a civilization like that doesn't mean anything.

Why didn't it simply degenerate into the machines that ruled it? Why keep all those humans if they must live like machines?"

FACE shrugged. "When the city was instituted, there was a population of that size to allow for. Then, it had a rigid human government, and there was crime and punishment and pain and happiness. They were disposed of in a few generations—they were not logical, you see, and the city was designed on the philosophy that what is not logical is also not necessary. By that time the city was so steeped in its own traditions, there was no one left to make such a radical change as to cut down on the population. The city could care for that many—likewise it could not exist as it was unless it did care for that many. Many human offices were disposed of as they became unnecessary and automatic. One of these was that of controller of population. The machines took care of that—they and the unbreakable customs."

"Hell!" said Delehanty explosively. "I wouldn't go for that. Why didn't the people push the whole thing over and get some fun out of life?"

"They didn't want it!" said Face, as if he were repeating a self-evident fact, and was surprised that he had to. "They had never had that sort of life; they never heard or read or saw anything of the sort. They had no more desire to do things like that than you have to play patty cake! They weren't constituted to enjoy it."

"You still haven't told us why you left the place," I reminded him.

"I was coming to that. In the city there was a necessity for the pursuance of certain knowledges, as a safety measure against the time

when one or another of the machines might need rebuilding by a man who understood them. Now the machines which supplied the people with everything from baby pap to muscle rubs, transportation to air conditioning, naturally covered such a vast number of highly specialized fields that it was necessary to maintain quite a number of men educated along these lines. There was only one of these men detailed to each field—astronomy, astrophysics, biology, and so on. He learned what his predecessor knew and spent the years of his life learning what else he might and teaching it to the next in line.

"One of these men was an antiquarian named Hark Vegas, which is really not a name at all but a combination of sounds indicating a number. His field was history—the development of all about him, from its earliest recorded mythologies and beyond that to its most logical sources. In the interests of the city, he so applied himself to his work that he uncovered certain imponderables—historical trends which were neither logical nor in harmony with the records. They were of no importance, perhaps, but their existence interfered with the perfection of his understanding. The only way he could untangle these unimportant matters was to investigate them personally. And so—that is what he did.

"He waited until his successor was thoroughly trained, so that in any eventuality the city would not be left without an antiquarian for more than a very little while, and he studied carefully the records of the city's customs. These forbade any citizen's leaving the city, and carefully described the boundaries thereof. They were so very old, however, that they neglected to stipulate the

boundaries along the duration dimension, since duration perception was a development of only the past four or five thousand years. As an antiquarian, Hark Vegas was familiar with the technique. He moved himself out along the duration of a metallic fragment and thus disappeared from the city.

"Now this unheard-of happening disturbed the timeless balance of the city, for Hark Vegas was nowhere to be found. Within seconds of his disappearance, news of it had reached the other half of the city, and the group of specialists there.

"The matter involved me immediately for several reasons. In the first place, my field was—damn it, there's no word for it in your language yet. It's a mental science and has to do with time perceptions. At any rate, I was the only one whose field enabled him to reason where Hark Vegas had gone. Secondly, Hark Vegas was my contemporary in the other half of the city. We would both be replaced within a week, but during that week there would be one too many in my half of the city, one too few in his—an intolerable, absolutely unprecedented state of affairs. There was only one thing to do, since I was qualified, and that was to find him and bring him back. My leaving would restore the balance; if I were successful in finding him, our return would not disturb it. It was the only thing to do, for the status quo had to be maintained at all costs. I acquired a piece of the metal he had used—an easy thing to do, since everything in the city was catalogued—and came away."

FACE paused to light a cigarette. The man smoked, I had noticed, with more sheer enjoyment than anyone I had ever met.

"Well," said Harry impatiently, "did you find him?"

Face leaned back in a cloud of blue smoke and stared dreamily at the ceiling. "No," he said. "And I'll tell you why.

"I ran into a characteristic of dimensions that was so utterly simple that it had all but escaped me. Let me give you an example. How many sides has a cube?"

"Six," said Harry promptly.

Face nodded. "Exactly. Excluding the duration dimension, the cube is a three-dimensional body and has six sides. There are *two* sides as manifestations of each dimension. I think I overlooked that. You see, there are four dimensions, but eight—*directions!*"

He paused, while the three of us knotted our brows over the conception. "Right and left," he said. "Up and down. Forward and backward—and 'beginningwards' and 'endwards'—the two directions in the duration dimension!"

Delehanty raised his head slowly. "You mean you—didn't know which way to go?"

"Precisely. I entered the durational field and struck off blindly in the wrong direction! I went as far as I reasoned Hark Vegas had gone, and then stopped to look around. I found myself in such a bewildering, uproarious, chaotic world that I simply hadn't the mental equipment to cope with it. I had to retreat into a deserted place and develop it. I came into your world—here, about eight years ago. And when I had begun to get the ways of this world, I came out of hiding and began my search. It ended almost as soon as it had begun, for I stopped searching!

"Do you know what happened to

me? Do you realize that never before had I seen color, or movement, or argument, or love, hate, noise, confusion, growth, death, laughter? Can you imagine my delighted first glimpses of a street fight, a traffic jam, a factory strike? I should have been horrified, perhaps—but never had I seen such beautiful marvels, such superb and profound and moving happenings. I threw myself into it. I became one of you. I became an accountant, throttling down what powers I alone of all this earth possess, striving for life as a man on an equal footing with the rest of men. You can't know my joy and my delight! I make a mistake in my entries, and the city—this city, does not care or suffer for it, but brawls on unheeding. My responsibilities are to myself alone, and I defy my cast-steel customs and laugh doing it. I'm living here, you see? Living! Go back? Hah!"

"Colors," I murmured. "Noise, and happy filth, and sorrows and screams. So they got you—*too!*"

Face's smile grew slowly and then flashed away. He stared at me like some alabaster-faced statue for nearly a full minute, and then the agile tendrils of his mind whipped out and encountered mine. We clutched each other thus, and the aura of our own forces around us struck two men dumb.

"Hark Vegas," he said woodenly.

I nodded.

He straightened, drew a deep breath, threw back his head and laughed. "This colossal joke," he said, wiping his eyes, "was thirty-eight thousand years in the making. Pleased to meet you—Jack."

We left then. Harry and Delehanty can't remember anything but a poker game.

# IN TIMES TO COME



"SIXTH COLUMN" concludes this month, and the new serial, beginning next month, is on hand. It's a yarn by L. Sprague de Camp in his best and wackiest manner, guaranteed for grins. "The Stolen Dormouse" concerns a world of the future—some hundreds of years hence—in which a new Feudal hierarchy has been built up. The noble houses are business houses—and furious are the duels between the members of the houses, most carefully prescribed as to the proper code. A Businessman—Sir Businessman Charles, say—may use his duelling stick only on his equals. His Efficiency Jones, or Researcher Brown are in another caste altogether.

The "dormice" incidentally, are those individuals who, having tired of the world as it is, have taken a nap for the next century or two. Suspended animation induces complications—particularly when one of the suspendees is stolen.

Theodore Sturgeon has a novelette coming up, too. The tale of a man who played god to a homemade microcosm—and forgot that he still had to live and get along in his greater world himself. "Microcosmic God" introduces, incidentally, an excellent way to produce inventions in a hurry, on order!

THE EDITOR.

## ANALYTICAL LABORATORY

Because the January issue contained more than the usual number of stories and articles, and because the articles were rated this time as well, place-numbers went from 1 to 9 this time. In consequence, the score-points run higher than usual in the Lab this month. The first installment of "Sixth Column" and "The Mechanical Mice" are practically tied for first place, because of this, despite the difference in score-points. The results were:

<i>Story</i>	<i>Author</i>	<i>Score</i>
1. Sixth Column (Part I)	Anson MacDonald	1.7
2. The Mechanical Mice	Maurice G. Hugi	1.9
3. The Traitor	Kurt von Rachen	3.35
4. The Day We Celebrate	Nelson S. Bond	3.55
5. Lost Rocket	Manly Wade Wellman	4.72

THE EDITOR.



# PUTSCH

By Vic Phillips and Scott Roberts

***"Tactics" is the military art you use when you've got the weapons. "Strategy" is what's called for when the other fellow has everything and you've got a pop-gun!***

Illustrated by M. Léip

THE radio receiver on GS42 gave a sudden, startled beep, then tore loose with the spine-chilling, high-pitched, broken stutter of the interplanetary emergency call. Any-

where in the Solar System that call meant hell was popping!

Serd Larkin jumped; reached for the radio controls and toned down the call. He punched the position

co-ordinates on the integrator keys of the ship's chart. Two hairlines of light leaped out and intersected.

"That's funny! It's coming from the old Landing Station, away this side of Venus City. But, there's no one there."

"Sure there ain't nobody there," agreed Benny Haines, the Geological Survey ship's tubby pilot. "That noise comin' in is just a couple of Venusian bean trees rubbin' together."

"Shut up, here's something from Venus City." Larkin brought up the volume, "Say! It's Governor Allen again."

The governor's voice surged into the tiny cabin.

"Repeating orders given in transmission 369B, all ships are to report in to Venus City without delay."

Serd cut in the ship's transmitter.

"GS42, Serd Larkin, Benny Haines. We've picked up an emergency call. We'll come in as soon as we've attended to it."

Followed a long pause, then Governor Allen's voice came in again. It sounded strained and unnatural.

"I am ordering you to report immediately without any delay, on my authority as governor," he said stiffly.

Benny leaned across to the transmitter mike.

"Ordinance 141 of the Operating Code states that an emergency call takes precedence over all flying orders," he quoted excitedly. He was an authority on the Operating Code. "So you can take your recall and—"

"We'll be in as soon as we have surveyed this call," Serd cut in hastily.

"You are ordered to come in immediately without delay," the governor repeated woodenly. There was no mistaking the rigid terror behind

his stilted words. "You are ordered—"

Serd cut him off. "Say that guy's so damn scared he can't think!" he stated incredulously.

"Yeah," agreed Benny, as he slammed the ship's throttle full open. "He's scared all right an' whatever's scarin' him don't want us goin' near the old Landing Station."

"That's our next stop then. It's just ahead."

They emerged from the tortuous, shattered grandeur of Ragged Pass into the valley of Venus City. The world dropped away into emptiness as the tremendous chasm yawned below them. Far across to the south the Magna Escarpment reared eternally vast, a titanic ridge, towering up thirty miles through cloud levels, stretching half around the planet, guarding the extreme south Polar Region.

The little ship swung breathtakingly out over the ragged cloud continents that veiled tremendous, unguessable depths. It thundered westward down the great valley toward the old Landing Station. The station had been built on a narrow ridge that crossed the valley of Venus City and it was here the first Earthian outpost on Venus had been established.

Later, when the growth of the colony crowded the limited level space of the ridge, the entire settlement had been moved three hundred miles westward to a similar, more extensive land formation where the great new headquarters of Venusian exploration had grown into Venus City.

There was no mistaking the verdant green streak across the width of the valley that swung in below them.

"Oh, boy! Look there over the north end of the ridge. Fight!" yapped Benny.

"Fight. Hell it's a pushover. Look at that ship go!"

Below them a single ship was flinging itself wildly through the sky with incredible violence and speed. Three other ships, awkward and cumbersome by comparison, were doing their best to avoid the vicious thrusts of the attacker. It dived furiously through the formation and swept upward again. A sudden stab of lurid flame blasted the stern of one of the slow-moving ships. It staggered, then fell away toward the ridge.

"A hit!" Serd yelled. "That guy's fast! Whose side are we on?"

"We've got to get that ship. The other three are lifeboats; they must have sent out that emergency call."

"Get it? How?"

"Watch this," Benny answered grimly.

THE LITTLE survey ship plunged down, coming in astern of the rising attacker. Benny pulled up to pancake on top of him. Serd got a momentary glimpse of the pilot's startled face below him.

"Got him!" Benny snarled, then the ship below them vanished in a burst of impossible speed.

"He got away!"

"That's what you think. Look!"

The fleeing ship screamed toward the jungle-draped mountainside, straining madly to warp its course away from battering destruction. Breathlessly the men in the survey ship watched the mad, careening flight. For a moment they thought it had escaped, then it ripped into the heavy jungle growth, smashed into a jutting knee of the mountain, blasted into a blinding incandescence. All that remained was the thick, slow drift of white smoke from the smoldering jungle.

"Boy, oh, boy, that guy sure didn't

learn to judge flying speed on Venus," Benny muttered as he let his breath go. "What are those other ships doing?"

"Making in at the old Landing Station. Let's go down and see if anyone can talk sense into this business."

Benny swung the ship down in a tight spiral, stalled in onto the slope, crashing through the tangle of vines and light brush, which swung back, entirely concealing them. Serd swung the side door panel open and they climbed out. The warm, ageless, living stillness of Venus flowed patiently around them. They listened. Far off a couple of gliding lizards barked raucously.

"They landed in the open on the site of the old Administration Building," Serd said. "Let's go."

They emerged from the jungle. Thirty or more people milled about the damaged lifeboat, getting the crew out. A tall, graceful brunette looked toward them.

"Well, here we are," Serd called, brightly. "Consider yourselves rescued."

There was a grim twist to the girl's smile.

"Thanks, consider yourselves rescued, too."

"What do you mean? Who are you people anyway? What's this all about?"

"We're Free People," the girl replied. "That emergency call of ours kept you out of Venus City and that's dangerous country now."

Some of the instinctive friendliness went out of Serd's eyes. He knew the Free People. They were a product of the times. Atomic energy had given the System unlimited reserves of power. Work had become practically unnecessary, but there were still those who chose to do it. Only the Free People took advan-

tage of the situation and spent their time in enjoyment and travel. Those who worked and those who didn't mutually despised each other.

"You can start explaining any time," Serd instructed coldly. "And make it sound good."

The girl's lips tightened, her eyes narrowed. Serd wondered what had made him think she looked soft. Now with the dull anger flaming from her eyes she was suddenly magnificent. Several of the men closed in behind her, big, competent young fellows, not the usual type of neurotic Free People.

"The Centralists are in Venus City with weapons. They're making Governor Allen call in all outlying ships," the girl stated flatly.

Serd laughed shortly.

"Centralists? That crazy bunch of blue-shirted coots? Where'd you get your information?"

"We get around," the girl snapped. "We haven't been stuck on one planet all our lives."

A big, heavy-shouldered, easy-going blond moved forward.

"Maybe if you two quit scrapping we could talk this thing out," he suggested. "Your opposition here is Osa Lane. I'm Pader Norton and these others are more of the Free People. We're straight from Earth. This business in Venus City looks bad."

"What do you mean—bad?" demanded Serd. "What have these Centralists got?"

"Electron disruption projectors, powered from Earth by space-warp transmission."

"Oh—yes? That stuff's still in the experimental stage."

"Do you know anything about the Centralists?"

"I know they've been making a nuisance of themselves on Earth,

parading around in their blue night-shirts—"

"They're more than a nuisance now," the girl cut in quickly. "They're a menace! They've jumped the gun on this space-warp transmission. It's dangerous to handle, but they're taking that chance. They maintain that Earth should be the center of control in the System. They want to make it that, and direct all activities from there. Their plan calls for absolute dictatorship over the whole Solar System. They think we're taking it too easy. They want to rush everything." There was intense distaste in Osa's voice as she spoke. "Space-warp transmission is just what they want. Their idea is to set up generators on Earth, convert all equipment in the System to electron disruption power and control it directly from their Earth base. That would give them absolute control."

"What makes this space-warp transmission dangerous to handle?" Benny asked.

"No reliable insulation," Pader replied. "Or circuit breakers. If they get a major equipment breakdown, the surge back of power is liable to wreck everything. They've been lucky so far. They wrecked our spaceship, when we landed, in about forty-five seconds. We just got away in time. I guess they didn't want anyone cruising about Venus warning people. That ship you crashed didn't have an electron disruption projector on board or we'd have been done for."

Benny's voice sliced in.

"So what are we expected to do? Go clean up on these tough parties with a couple of cutting torches? What's your line?"

"Keeping ourselves alive was our first thought," Pader Norton returned grimly. "But if these Cen-

tralists don't get thrown out promptly it's going to be damned uncomfortable living in this System."

"All they need is one good equipment failure under high load to finish them," Osa said hopefully.

Serd glanced quickly at Benny for confirmation. The pilot nodded.

"O. K. What do we do?" Serd asked abruptly.

"We'll need all the ships and men we can get," Pader said. "Are there others?"

"There's Doc Hallidane and his crew on an entomological survey around here somewhere, and I'm pretty sure Professor Lord is out with a ship doing botanical field work. If they haven't reported to Venus City already, we can get them. Then Pete Carson's got a crew and a ship full of mining equipment somewhere east of here on the Magna Escarpment."

"Good. Get 'em."

"Benny, hike back to the ship and see if you can raise them and anyone else who will answer," Serd directed.

"O. K., but I don't think we got a chance," Benny warned ominously and headed back for the survey ship.

"What about defense? Will anything stop this electron disruption business or slow it down?" Serd asked.

Pader Norton glanced at Osa. She shook her head. "Nothing, as far as I know. Of course it takes time on large masses of matter. If we could get inside a mountain somewhere, it would take them a while to dig us out."

"Well, we can do that," said Serd. "This old Landing Station was water-powered. The generating rooms were cut out of the mountain at the north end of the ridge here to save landing room and there's a tunnel, that brought the

water down, drilled about two miles through the middle of the mountain to a lake back in the hills to the north."

"Swell, let's go," Pader Norton nodded vigorously. Then returning to the Free People, "Machetes and cutting torches," he directed. "Better bring lights, too, and shift in some supplies, we might be holed up for a while." Then he paused. "Just a minute, is there another way out of this hole?"

"Two or three, higher up the mountain. They're construction tunnels that were drilled in from the outside."

WITH half a dozen cutting torches in the lead the trail melted through the thick brush toward the north end of the ridge at a slow walk. They located the tunnel by following the foundations of the old Administration Building. They were clearing away around the entrance when Benny caught up with them.

"I got 'em all," he told Serd. "None of them like the way Governor Allen sounded. They're coming here.. Doc Hallidane and Lord will be here in about five minutes, Pete Carson's already on his way. I told them to come in beside the old Administration Building where we landed and ditch their ships in the bush. We don't need to advertise who all's here. What are you supposed to be doing?"

"Getting under cover. We're going back in to the old generating rooms that way the Centralists won't get to burn us up quite so soon."

"What's to prevent their coming in after us?" Benny demanded.

"They'll probably just clean up on our ships and let it go at that," Pader Norton suggested.

The clearing away around the en-

trance to the generating rooms was going fast. They ripped aside the last of the heavy mat of vines and creepers that wadded solidly against the face of the mountain. A plane whispered quietly by overhead, atmospheric wings fully extended, gliding in low without power. Another followed it a few seconds behind, then a third swung in higher up.

"Doc Hallidane and Professor Lord. The big ship's Pete Carson and his outfit," Serd explained with satisfaction. The three planes vanished over the site of the old Administration Building. The ripping crash of their landing as they crushed down through the heavy foliage drifted back to the Free People around the mouth of the tunnel.

"Say the Centralists could sneak up on us like that," Pader said thoughtfully.

"Maybe we better post lookouts," Osa suggested.

Serd nodded, "Good idea. Benny, go on down and bring Hallidane and Lord up here."

Benny muttered to himself as he vanished down the trail. Osa directed two of the girls in the group around the tunnel mouth back to the ships to watch for the Centralists.

Serd and Pader led the way into the abandoned passage. A hundred yards in the high, domed roof of the first generator room, cut out of the solid rock, arched darkly above them. The foundations of the huge old turbo-generators loomed vastly in the great room. The intake ends of the sixty-inch water conduits were shields of Stygian blackness ranged against the inner wall.

"These were the secondary generators, the primaries are farther in," Serd explained. The dust of years fluffed soundlessly under their feet as the cavalcade of Free People followed Serd and Pader another

fifty yards to the smaller room that had housed the high-pressure primary generators.

"I guess we can camp here," Pader Norton directed. "What about drinking water?"

Serd swung a light to a wide band of pipes bracketed against the wall of the passage.

"Those serviced the Landing Station. They're probably shut off at the master valve panel. That's farther up the main shaft. There used to be elevators but it was all torn out long ago. The emergency stairs are left."

PADER AND SERD returned to the entrance. Benny was coming up the trail with eight or ten men behind him. Serd recognized the fierce little hairy brown wisp of a man in the lead. It was Doc Hallidane. The huge, ragged gray form of Professor Lord towered behind him. The wide, chunky figure of Pete Carson at the head of his miners followed them.

"All right, Serd, let's have it," Doc Hallidane invited as soon as Serd emerged from the tunnel. "Benny won't talk and you're holding up some very important work I was doing."

"Quit talking and give him a chance, yuh little runt," Professor Lord suggested good-naturedly.

Doc Hallidane snarled at him but Serd cut in hastily before anything could happen. The verbal war as conducted by these two was famous all over Venus. With Osa and Pader Norton prompting, Serd sketched the situation briefly.

Professor Lord nodded slowly. "I saw an experimental demonstration of this electron disruption business the last time I was on Earth and it's sure dynamite," he said soberly.

"It's dangerous at both ends of the transmitter," Osa pointed out.

"Listen!" Professor Lord said suddenly.

High-pitched sound was building up, a vicious, whining drone, indicating tremendous, high-pressure power. It implied a threat they all felt.

Serd could feel the hair on the back of his neck lifting. "It must be the enemy," he said; his voice had tightened up.

The lookouts came bounding up the trail. "Ship, way off toward the west, coming fast!"

"Back into the tunnel," Serd ordered. Doc Hallidane, Professor Lord and Pader Norton stayed with him in the entrance to watch.

The sound of approaching aircraft grew and built to a spine-chilling wail of impossibly intense power. Incredulous silence closed down on the men in the tunnel. They all worked with atomic drives and knew the sound of their output. The power production indicated by the sound they heard simply couldn't exist but it continued to beat its insistent, rising threat into their ears.

"Merciful heavens! Something is sure as hell overloaded," Professor Lord muttered.

"There it is!" Serd snapped.

"There it was," Doc Hallidane corrected. The slim streak of a ship flashed at incredible speed across the field of vision from the narrow clearing.

"Maybe they've missed us," Pader Norton suggested hopefully.

A whining howl slashed through the tumult of sound that filled the valley as the Centralists' super-powered ship swung about, coming back. It came in higher. They heard the crackling, crushing rush of its repulsor field contact surging up the ridge as the weight of the ship, transmitted through the field,

smashed the jungle flat along its course.

"Repulsor field extension twelve hundred feet or more," Pader Norton's voice was awed and incredulous. "That's better than three times our limit."

The incoming ship began to rise abruptly as the field contacted the ridge, then it dropped jerkily, caught itself in a jarring recovery.

"I guess that much power is hard to control," Serd suggested.

"That's it," Pader Norton told him. "No one can handle it yet. Those fools are rushing everything. They're just—"

The Centralists' ship had worked itself into position. There was a sudden tensity in the air. A tenuous fluff of steam outlined an invisible, widening beam projected from the ship, a weak ripple of blue fire flashed momentarily. A crackling, snarling crash of thunder slammed with mad ferocity against the mountain wall. Flame and steam and rock fragments ripped upward in a violent, concentrated explosion. A mighty hand hurled the watchers stunningly back down the tunnel.

Serd pulled himself dazedly out of the tangle. The rest of them were recovering. A foot waving around hit Serd in the shin. He bent down and pulled on it and Osa came to light from under the pile. She pushed her hair out of her eyes and sat up.

"Now maybe you think those people are fooling," she snapped. Her top lip was cut where she had scraped her face along the floor and one eye was swelling rapidly. Her neat blue and silver skirt and tunic ensemble was torn and streaked with moss stains. She looked fighting-mad as Serd helped her up.

"Let's go out and see what the

rats have done," she suggested beligerently.

"Yeah, and have them do it to us. Nothing doing," said Serd. "We'll stay in and look."

Outside they could hear the sizzling fizz and crackle of fire trying to make progress through the lush greenness of the jungle. The creaking crack of rocks cooling and splitting, shocked through the air.

The jungle outside had been blown flat. Where the ships of the Free People had been the country was simply a blasted mess. Scorched and shattered rock was the only thing left in the wide, shallow crater. Steam rose sluggishly where discouraged fire was slowly losing its battle with the jungle. The Centralists' ship was coming down jerkily toward the rotunda foundation of the old Landing Station.

It made several ineffectual stabs at landing before finally making it in about a hundred yards from the entrance to the tunnel.

"They're coming after us," Pader Norton said hollowly. A hatch opened in the after end of the Centralist ship and half a dozen blue-shirted men started struggling apparatus out onto the ground. They assembled it rapidly into a clumsy-looking arrangement framed in welded metal girderwork. There were two heavy metal plates one above the other, separated by stubby columns and on top a short horizontal, transparent cylinder, massively banded with dull metal. The whole assembly was mounted on skids.

"That's a smaller edition of what fired at us in Venus City," Pader said.

"It looks pretty crude," Serd suggested.

"Perhaps," Osa conceded. "But if that crude arrangement gets up

here we'll be finished, and they're heading this way."

The men around the projector started dragging it along the upward slope of the top of the ridge toward the mouth of the tunnel.

"Well, they don't have to get here," Professor Lord growled.

"What's going to stop them?" Hallidane snapped.

"If you're half as good at getting through the bush as you say you are, we could sneak out there and bushwhack the whole crowd."

"For once you're talking sense," Hallidane agreed. "But we gotta have something to kill them off with."

Professor Lord picked up a large chunk of rock in his huge hand. "Bash 'em," he said briefly.

"You would," Hallidane snorted disgustedly. "And have the others in the ship burn you up while you're doing it."

"All right, you think of something."

"I already have. Blowguns. A couple of lengths of gama reed will do for the tubes, use pica thorns for darts. We can wad them with cello-cotton from the first-aid kit and I've got some lizard venom specimens in my ship that'll lay those guys out so fast they won't even blink."

"Well, quit stalling around, let's go."

"I'm waiting for you," Hallidane snarled. "And watch where you put your big feet. Remember, we're trying to take them by surprise."

"Just see that you don't trip over any roots and we'll be all right," Professor Lord growled. The two of them slipped out into the jungle and vanished without a sound.

Pete Carson stared out at the activities of the Centralists for a moment.

"The way their ship is lying we

could sure dump a heap of rock on it if we could get up above them on the slope out there," he said abruptly.

Serd glanced at Osa. Her puffed-up lip and half-closed eye made a fiendish grimace out of her smile of satisfaction.

"Let'th go. We'll bury the bumth," she managed.

"We can get you up above," Serd said. "Can you get some explosive?"

"Did you think them was sandwiches we brought in our packs?" Carson demanded. "We got enough dutrol to blow this mountain apart."

"Grab your stuff and follow me. Have you got drills?"

"Won't need 'em, there'll be broken rock on the face. Come on you miners! We got a job to do," he bellowed to his crew. They came on the run.

"Up here," Serd directed from the first of the steel stairways that led up the shaft. The clattering slough of hurrying shoes on metal filled the huge shaft with echoes as they followed. Two hundred steps and they were in the valve room. The first construction tunnel led off from here back toward the face of the mountain. Serd led the way. They slashed through the thick jungle across the narrow ledge outside the tunnel.

SERD POKED his head anxiously out into the open. The mountainside dropped out and down below them and farther out and down and down in mile-long, sweeping concave curves of luxuriant green dulling to the blue of distance and mist, blue-black out beyond in the depths. The ridge, the top of a massive mountain that filled the width of the vast chasm, seemed to hang like a fairy bridge, floating brilliant green on the

misty blue blur of impossible depth.

Men struggled there with the projector, two hundred feet below, and it was closer.

"We gotta hurry," Serd said anxiously as he felt someone move beside him.

Osa's voice answered, "Yeth, it lookth like it. Damn thith lip!"

"You should have stayed below and got it attended to."

"And mith thith? Don't be thilly."

Serd caught a furtive suggestion of movement in the jungle beside the blasted crater where the Free People's ships had been. The crew of Centralists were grunting and struggling, heaving their equipment up the slope of its side. Immediately below the ledge and to either side Serd and Osa could hear Carson and his men as they slipped carefully through the heavy jungle on the mountain face. They were all experts and this job of scaling off a face was old stuff to them.

"Look!" Osa hissed and pointed.

Serd followed her line and saw where Doc Hallidane and Professor Lord lay behind the last screening of brush at the edge of the crater. They hadn't been there a moment before. As they watched two of the men on the projector crew stiffened and collapsed.

"Got 'em!" Osa muttered with deep satisfaction.

The rest of the projector crew looked inquiringly at their companions, then two more of them slumped to the ground. Possibly the other two lived long enough to know what killed them but not long enough to do anything about it. A yell drifted up from the Centralist ship. A man stood at the open after hatch looking toward the inert projector crew.

"Figure that one out, you

thkunth!" Osa invited viciously.

"Just quicklike I'd say you seemed to be a trifle bitter," Serd suggested mildly.

"They wrecked our thyip and would have killed uth all," Osa gritted. "Bethideth they're crathy."

Carson scrambled back onto the ledge with his crew behind him like a pack of hounds. "We're all set. How's it going? Doc and Lord get clear?"

Serd just pointed to the almost imperceptible stirring of the jungle where the two men faded quietly away from the crater.

"We'll miss 'em," Carson grunted as he poked the firing keys of his portable transmitter.

A ripping, heaving thunder of sound surged out from the mountain face. The ledge shocked jarringly upward. A slice of jungle-shrouded mountainside surged outward, collapsed, crumbled on itself and tumbled in shattered rubble toward the ridge, smashing down on the forward control bridge of the Centralist ship. The stern flung up, the man in the after hatch was hurled clear, a twisting helpless doll that smashed down into the jungle. Then, incredibly, the ship tore itself loose from the encroaching slide, rolled half over and leaped into the air.

"What power!" Carson whispered in amazement. He blinked stupidly at the others. "It got away."

"That'th what you think," Osa lisped grimly. "Look!"

The stern of the ship rose rapidly, racing the bow upward. At five hundred feet the stern won and the swinging momentum slammed the ship over on its back. It shuddered with the downward thrust of the tremendously super-powered repulsors. It rolled over as it fell and at two hundred feet the repulsor fields

came to bear on the ridge again.

The tortured ship jarred agonizingly to a stop in midair, the bow buckled with a scream of torn metal as its back broke. It started to rise again, with weary, crippled slowness, the stern going up to repeat the disastrous maneuver. Then it just flopped, plummeted down without power. The forward section burst like a rotten melon; the stern half tore loose and leaped end over end, ripping a deep gash through the rich jungle in its mad clanging flight to the misty blue depths. The echoes rumbled away, battered back and forth and faded into the vast, waiting silence of the green planet.

The group on the ridge stood, stunned into silence by the high-speed violence of the action.

"That's that," Carson said finally.

"Their power mutht have been thyt out from headquarterth jutht at the latht there," Osa said thoughtfully. "They couldn't rithk a major equipment failure while they were tranthmitting."

"Probably," Serd agreed. "Let's go below and get that lip fixed so you can speak English again."

"Nuth!" Osa told him as they started back down the construction tunnel.

Everyone was in the secondary generator room when they got there.

"Can you do anything about a face like that?" Serd asked Doc Hallidane, indicating Osa's damaged features.

"Boy, that's a shiner," Hallidane admitted. "You been fighting with your menfolks again?"

"Don't be funny," Osa suggested. "Jutht fieth me up." They went hunting for Hallidane's medical kit.

"Lord, Carson, Norton, come here," Serd said suddenly. "I've got an idea. We've got some stonework

and pipe fitting to do," he talked fast.

"You got something there," Norton agreed.

"We'll blow 'em t' hell," Carson seconded.

PADER NORTON rounded up the Free People and they started building a barricade halfway between the secondary generator room and the entrance to the tunnel. They used broken rock from the slide, fusing it together with one of the cutting torches. Half a hundred pairs of hands pushed the work forward rapidly. Benny and Serd started cutting, fitting and welding pipe with another torch. They got four lines of three-inch pipe laid and connected into a sprinkler system over the barricade and the job was finished. The last of the builders scrambled back over.

"I think I heard something coming," Osa said.

"Don't be silly. They'll get here fast but not that fast," Serd told her.

"Listen," Professor Lord commanded. The murmur of voices died away and into the silence crept a deep, distant note of ominous power.

"They sure don't lose any time," Carson muttered.

"Sounds bigger," Hallidane contributed.

"We're gonna get it this time," Benny said, his voice rising.

The sound of the approaching ship grew at incredible speed. The vast echoes shifted and slammed about in the valley, boiled and thundered higher and higher. There wasn't a sound from the half-hundred people behind the barricade. Their eyes were big with fear as they looked at each other and found no reassurance.

"Power. Just brute power," Pro-

fessor Lord muttered in an awed voice.

"Without adequate control," Osa snapped.

The crashing echoes built to a terrific climax then lost their source and started to die down.

"They're coming in," Benny warned ominously.

They heard the monstrous giant's tread of repulsor fields contacting the jungle and tramping it flat. The crushing sound stopped and settled. They waited tensely, acutely conscious of the great ship that hovered outside. A high, moaning whine knifed through the air. The harsh, splattering crack of rocks exploding shocked agonizingly down the tunnel. It built to a ragged, rattling thunder. Dust and smoke rolled chokingly in and swirled up against the barricade. The crackling barrage of bursting stone was blasted to massive violence, the rushing roar of fire was somewhere in the deafening background. The whole mountain shook and trembled with tremendous earthquake shocks. Then, incredibly, the echoes lost their support and died away. Astounded silence flowed cautiously back with the choking, slow swirl of dust and smoke that drifted over the barricade.

"Fifteen seconds," Osa said unbelievably. "That's all it took."

"I'm gonna see what they did," Benny grunted and scrambled over the barricade.

He disappeared in the smoke; they saw him duck low under the edge of it. The sound of his feet lost itself among the straining, laborious cracking of cooling stone. The sizzling fizz of jungle burning came to them and the smoke was thicker in the waiting silence behind the barricade. Then feet were com-

ing, running. Serd pulled Benny back over.

"They're coming," he panted. "They must have landed before they started wrecking the place. They've missed the ships over past the Administration Building but they've cleaned up the jungle outside so no one could sneak near them. They got two projectors at least."

"Up in the construction tunnel I guess is the best place now," Serd decided. The crowd behind the barricade melted magically.

"Those are the four valves," Serd instructed as they reached the valve room and he found the ones he had marked. "Lord, Pader, Benny, take one each. The rest of you wait down the tunnel."

A short whine and a splattering crack echoed up from below.

"They've started," Benny yapped fearfully. The four men stood tense, the shocking cracks became heavier, built to a climax.

"Let her go!" Serd shouted. Eight hands spun madly at the slow threads of the high-pressure valves.

Nothing happened. The sharp, concentrated blasts of destruction continued to rip out from below. The high-pressure hiss of water slid down the scale, hit a bass and scraped solidly through the three-inch lines. They heard that, then a slow, building thunder of sound rose and rushed and heaved tremendously. A solid, resistless *Whoosh!* slammed up the shaft. The mountain trembled and shook, the four men were thrown to their knees, their hands still on the valve wheels.

Serd got to his feet groggily. He felt scalded and scared and wet. That rush of air or steam or whatever it was had been hot. He heard the high-pressure beat and rush of water; he started automatically shutting the valve in his hands.

"Seems like you were right," Professor Lord said quietly. "Obviously an electronic disrupter beam converts water into steam very rapidly."

"Rapidly?" Carson crowed as they hurried down to the barricade. "I betcha what's left of those guys has been blasted back to last Friday."

THE TUNNEL was immaculately clean, scoured. The barricade had vanished; the water pipes were split and flattened against the wall. There was no sign of the Centralists or their equipment.

"Well, it did a nice sanitary job," Professor Lord observed. "That's two lots of them. I wonder how long they're going to keep this up?"

Benny went questing ahead like a curious bird dog. Then he was back with a peculiar look on his face.

"We got rid of that first bunch all right but what are we going to do about this other outfit that's coming in now?"

"Huh? Where?" They went toward the entrance on the run. The Centralist ship lay fifty feet away across the entrance.

"That sure isn't much ship to kick up all the stink it did," Lord muttered.

"Probably it doesn't need fuel tanks," Serd grunted. "That's another projector they're setting up all right. I thought the treatment we gave them would scare 'em so they'd keep out of our tunnel."

"They must be getting desperate," Lord said thoughtfully. "They've got to get us now."

"They will, too. They're coming!" Benny chattered.

The crew around the projector finished their assembling and started purposefully dragging the bulky equipment toward the tunnel entrance.

"The hell they will!" Serd growled. "I got ideas. Come on, we're going upstairs."

The whole metal framework of the stairway cut loose with a short, heavy, resounding hum as they reached the top. Benny flashed the white beam of his atomic light downward.

"The whole bottom of the stairway's gone!" He yelled in sudden fear. "They've got us!"

"Whatever you're fixing to do you better do it fast," Carson said tensely.

"It's nothing very complicated," Serd explained. "You're just going to blow these water conduits." His mind flashed the vision of those five, solid columns of water sloping two miles back up through the mountain as he spoke. Released suddenly they would smash down with a liquid, pile-driver force that would wreck anything. He felt himself shaking. The bludgeoning, brute force of those millions of tons of water was more terrifying than the concentrated power of the Centralists' disrupter beam.

"I'll get the gang up to the next construction tunnel," he managed. "We gotta hurry."

Carson yelled for his miners and got to work. Serd and Osa and Pader herded out the rest of the crowd. The echo of their clattering climb up the great shaft mingled with the snapping, ripping detonations that came from below and urged them to faster flight. Evidently the Centralists were tearing everything apart as they came and taking no chances.

Carson and his crew scrambled into the higher tunnel behind the last of the Free People.

"All set?" Serd demanded.

"Yeah. Let her go any time. I—"

Carson's words were cut off by a deep, vibrant hum from the outside. The spluttering crackle of exploding rock filled the air. The stairway crumpled and vanished down the shaft. They didn't hear it fall. Fragments of stone skipped and ricocheted down the construction tunnel. Grunts and yells came from the Free People as some of them were hit.

"Let 'em have it!" Serd barked.

Carson stabbed viciously at the firing buttons of his detonator. A rolling surge of thunder built and heaved upward, then it vanished in the tremendous, obliterating crash of falling water. The mountain rocked as the liquid avalanche piled into the bottom of the shaft. The steady, rushing thundered solidly to a deafening, gargantuan roar and stayed there. Serd followed the Free People on a run for the outside of the mountain. The thunder of waters faded out behind them as they approached the outside end of the tunnel.

"Take it easy," Serd warned. "That ship is probably cruising around out there."

That slowed the crew down and he cautiously hacked out an opening through the vines. The surging rush of a mighty torrent was rapidly filling the great valley with sound.

"I don't see any ship," Osa said in a moment.

"There should be one," Serd grunted, but nothing moved in the vast reach of empty space they commanded from the mountainside.

"Look!" Osa pointed.

Half a thousand feet below a massive torrent of muddy water spewed out of the entrance to the generator rooms. It piled up and turned sharply east at the foundations of the Landing Station rotunda, leaping into space and plunging down

into the depths instead of continuing down the ridge. Something lay directly athwart the surging flood. It was the long, slim, battered shape of a ship.

"We got 'em!" It was Carson's awed voice.

"They should have been able to pull out with all the power they had," Lord said worriedly.

"Not a chance," Osa vetoed. "Their central distributor can't afford to shove power into equipment that's damaged or in danger of getting damaged; they'd get a surge back of power and they can't handle that."

"Well, what do we do next?" Benny asked. "Those guys are going to be sore now. I figure we should get out while the getting's good."

"Where would we get to?" Carson asked.

Serd thought quickly. The good landing possibilities within range of the atmospheric ships were decidedly limited.

"I'm afraid the only place in range where we can put down safely is just outside Venus City," he said slowly. "And that's not much good to us."

"Why isn't it?" Osa demanded. "That's the last place they'll expect us; they don't even know we've got ships. We might even move in on them. They certainly won't expect us to attack."

"Say—maybe you got something there," Carson conceded. "I'd like to dump a little dutrol around those birds in their own home town."

A half-hour's scrambling struggle took them down to the concealed ships.

"We'll have to dump some fuel to get everyone on board," Benny said thoughtfully. "But I think we can just about make it."

THEY DID. Two hours later three hundred miles of almost blind flying through a mad tangle of cloud and

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mountains lay behind them, and the brilliant lights of Venus City glimmered upward through the cloud layers. They cut their drives and slipped quietly down without power.

Benny led the way in from the south, making in over the city high above the effective range of the lights. They passed on to the virgin jungle at the northern end of the long ridge, settled carefully down to an easy landing, the four ships disappearing with ripping crashes into the jungle. Fifteen minutes of shouting and flashing lights got them all together by Pete Carson's ship.

"Well, what's next?" Pader Norton asked.

"I figure the best thing we can do is just go right into town," Serd told him.

"Yeah? What's the second best?" Carson asked.

"I mean it," Serd insisted. "These Centralists don't know any of us."

"I figured you'd start something foolish like that," Benny muttered.

The machetes started beating through the jungle again as they stumbled along in the indirect, cloud-diffused half light that was the best Venus could do in the way of darkness. It was beginning to lighten toward the early dawn when they reached the outskirts of the city.

The streets of the compact little headquarters settlement were brilliantly lighted. It was ominously quiet; no one was in sight. They slipped along a hundred feet, making no sound as they moved toward the massive towering wall of the Landing Station rotunda that lifted above the other city buildings.

"Oh . . . oh. Do you know what this is?" Osa whispered.

Serd halted, leaped back into the side street from which they had just

emerged and dragged the girl with him.

"What's the matter?" Lord demanded.

"A projector mounted in the street just outside the Landing Station.

"Well what didja expect? A welcome mat?" Benny demanded.

"There are other streets."

"Yeah, and other projectors I bet."

"We could find out." Carson gathered his attentive miners with a look. "Skitter round and see how they're posted," he directed.

"Where you going, Benny?"

"I'm gonna see if there's anyone alive in this town and what's been going on."

Serd and the others waited nervously, peeking out at the alert projector crew occasionally, where they were sharply visible against the white wall of the Landing Station rotunda.

Benny slipped back into the group. Serd recognized Markham of the Venus City Communications Service with him. The Communications man looked sore and scared.

"What are you guys trying to do? Get the whole city burned up?" he demanded.

"Hey, slow down," Serd advised. "Where do you get this burn-up stuff?"

"It's those Centralists. They had a setback somewhere up the valley here and they're hopping mad. We gotta stay off the streets and behave or they're gonna disintegrate the whole city. And don't think they can't! I've seen them—"

"We've seen them, too," Serd cut in. "And we're the setback they ran into. We've come down here so they can run into us again."

"Now look here, Serd. You aren't going to start anything here." Markham spluttered desperately.

"Good heavens, man! There's thousands of people—"

Carson's miners reported in.

"Seems like they've got all points covered," Serd summed up thoughtfully.

"That's what I say," Markham cut in anxiously. "They got us dead to rights. We can't move."

"We could remove one of those points they're covering," Carson said grimly. "Then make a dive through to the Landing Station and see what we could do there."

"You couldn't get near that projector," Markham snorted.

"I was thinking in terms of getting into those two buildings next to this projector up the street and blowing them down on top of it," Carson explained.

"What'll that get you?" Markham demanded wildly. "They'll just move another projector over—"

"That's it," Osa snapped tensely. "Make a diversion here, see? Then when they start to move another projector in I go through to the Landing Station and see if I can do a job on their power receiver."

"I'll handle that angle," Serd put in quickly.

"Think I can't do it?" Osa demanded.

"Sure, but—"

"But nothing. You don't know anything about a space-warp power receiver. You wouldn't know what to do."

"You can tell me."

"There's no time. Carson, how do you handle one of those detonators?" Carson glanced quickly at Serd then proceeded to explain rapidly.

"How do we know which projector they're going to move?" Serd demanded.

"The one to the right of us is closest," Carson supplied.

"Now listen, you guys—you can't do this to us," Markham wailed. Pader Norton and Professor Lord gave him the stern eye.

"Give me a minute to get over in the next street then fire when you're ready," Osa instructed Carson. The miner nodded wordlessly.

Serd just stared after her helplessly. He knew he should do something to stop her but he didn't know what.

Carson's voice brought him back. "I want to know how to get into those two corner buildings without being seen," he told Markham.

"Well, first of all you go—"

"No, we don't go. You come." Carson and his miners departed. Ten minutes seemed to flash by and they were back again.

"All set," Carson said grimly. "We'll see how those bums like being buried."

"Now wait a minute. We've got to get everything straight," Serd said anxiously. "We gotta make sure they bring that next projector here. We gotta get in there and make plenty of diversion. We gotta make sure they don't notice Osa. We gotta—"

"Take it easy," Carson growled. "I know what we gotta do." He punched in his firing pattern.

THE AIR grabbed and shook them. A rumbling thunder heaved to life up the street. The sharp, concentrated rattle of material exploding in a projector beam cracked out violently. Then it cut off and was smothered in the defeated, final crash of falling buildings.

"Come on!" Serd screamed above the racket and tore out into the wrecked street.

The Free People streamed after him, yelling and shouting to make

sure they weren't overlooked. They scrambled over the still tumbling heap of rubble from the two fallen buildings and into the cross street that skirted the rotunda of the Landing Station. A projector crew was in position to the right. Serd yelled and heaved a jagged chunk of broken cement. The Free People backed him up.

The projector crew instinctively ducked for cover as the primitive barrage pounded around them. Then two of them grabbed the skids of the projector and started heaving the heavy apparatus around.

"Get down, everyone!" Serd yelled and lunged forward. Someone kicked his feet together and he slammed down onto the roadway. He rolled over and saw Benny hurl his short compact body at the Centralists struggling with the projector. They went down in a fighting tangle.

The short transparent barrel of the projector suddenly glowed red. The apparatus cut loose with a violent, moaning hum of tremendous overload. Then abruptly the world ripped itself apart with a blindingly incandescent, thundering crash. Serd felt himself being hurled for miles before he blacked out.

When he came to he was apparently still flying through space. A portion of Venus City lay spread out below him. He must have been flying a long time; there were no lights in the city below but the soft, indirect light of a Venusian day made everything clearly visible. He could see the Landing Station rotunda but there was something wrong with it. The massive walls, built ten times over-strength to withstand the terrific violence of a possible atomic fuel explosion, were ripped and split and sagged wearily outward. Evidently he had ceased

rising and was hanging motionless in space; the city below didn't seem to be getting any smaller.

Something blocked off his view of the rest of the city. Something that looked like a white mountain range, probably clouds. He focused on them carefully. They wiggled jerkily; clouds shouldn't act like that. Abruptly he seemed to see them clearly in relation to their surroundings. They were his feet, under a sheet; he was lying in a bed, high up in a building that overlooked the wrecked Landing Station.

Time had passed. Where were the rest of them? He tried to sit up, made it halfway and fell back dizzily. Quick, soft footsteps approached.

"You shouldn't try that yet," a voice told him quietly. It sounded vaguely familiar. A face drifted into view among the red and blue lights that kept flashing in front of his eyes. They faded out.

"Osa," he said simply in recognition. "What happened, where is everybody?"

"The Centralists' power receiver failed under full load when I dumped a can of dutrol in it. The breakdown wrecked the Landing Station and a lot of the city."

"I know, I could see. You got through all right then. Many hurt?"

"Yes. Quite a few. A lot of the Centralists were in the station. We haven't found any trace of them."

"Where's Benny?" he asked and he knew what the answer would be. It was a long time coming.

Osa picked up his hand. "He's dead," she said finally.

Serd had been expecting it but a stab of sharp pain leaped through him at the finality of her words. Blackness rushed over him but he held onto her hand and pulled him-

self back. She was speaking.

"He saved a lot of lives," she said.

Of course he had, the crazy little coot. It was just like him to belly-ache all the way, then throw in everything and come through in the pinch.

"The Centralists are finished," Osa went on. "When the receiver broke down here the surge back overloaded the transmitter on Earth. Their whole plant blew up. Their trouble was they tried to rush everything; they didn't wait to build right. A lot of people died but it's all over.

"It was all over." The few words echoed soothingly, smoothing over pain and loss, filling in the ragged, torn places that hurt.

"What about you?" Serd asked

finally. "I guess you'll be leaving with the Free People."

"No," Osa said slowly. "We aren't Free People any more. The Solar System is partly our world now. We helped to save it; we've got to help see that it keeps operating now."

"What are you going to do?"

"I don't know yet. About the only thing I'm good at is handling a ship. I'll find some way to help."

Serd was silent a moment; there was something he was trying to think of. Then he had it.

"I'll be needing a pilot now," he said. There was a long pause.

"Will I do?" Osa asked softly, hopefully.

Serd gripped her hand reassuringly. "Sure will," he said drowsily and slipped contentedly into sleep.

THE END.

## Is there Magic in this Oriental Confection?

Only one man in the world knows the secret of Sen-Sen. Behind closed doors he blends its precious ingredients. And some people feel there's magic in its making.

Certain it is that Sen-Sen sweetens your breath and thrills you with its unusual haunting flavor. But some say it does more . . . gives men and girls who use it a special fascination.

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# SPACE HAS A SPECTRUM

By R. S. Richardson

***A science article on the non-emptiness of interstellar space. The void between the stars represents the most tenuous gas men have ever studied, but by weird instruments and high-power mathematics, its secrets are being determined.***

"Is there anything between the stars?"

A century, or even fifty years ago, an astronomer could have answered that question with a single word. Without the slightest hesitation, he would solemnly have assured you that the space between the stars is filled with ether. Otherwise, except for an occasional meteor, it is empty.

The ether, however, by its remarkable properties easily made up for the lack of other interstellar material. More rigid than steel, more transparent than glass, it allowed the planets to pass through it without offering the slightest resistance. Perhaps its most unique feature was the impossibility of detecting its presence. You could never hope to see the ether, or smell it, or make it apparent by instrumental means. Nevertheless, scientists felt quite confident it was always there on the job, busily transmitting energy from one part of the universe to another.

The ether was long ago consigned to the scientific junk yard, along with coronium, the Thompson atom, and Helmholtz's contraction theory. Nobody seems to care any more how light manages to get from one star to another. We accept the fact that it does without feeling the necessity of assuming some means of conveyance. Indeed, the mere thought of an all-pervading luminiferous sub-

stance is highly offensive to many scientific minds. The relativitists, in particular, shudder at the mention of that awful five-letter word, the e...r!

Today, more and more, astronomers are turning their attention from the stars to the matter that lies between the stars. For it is becoming increasingly clear that interstellar space is not just something for light to travel across, but a strange laboratory where experiments can occur impossible to describe in ordinary terms. It is a region where the speed of reaction between matter and radiation has slowed down until time has virtually stopped. A region where atoms hibernate in states of infinite lifetime, and clocks tick off centuries for seconds.

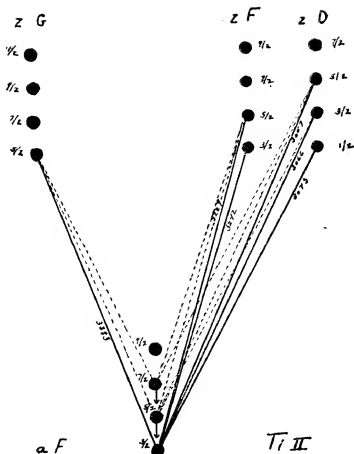
Astronomers have really had much of this new knowledge in their possession for several decades, and in a sense were aware of the fact without being exactly conscious of it. Here is the picture of interstellar space as it looked from a few years back.

Certain lines were known in stellar spectra of types O to B3 whose queer behavior branded them as definitely alien in character. To the casual observer they looked as genuine as H Beta of hydrogen, or 4686 of He II, but to one trained in this work certain telltale marks definitely

betrayed them as members of the fifth column.

Lines in spectra of early type are generally broad and diffuse, owing to the rapid velocity with which these stars rotate. Since half the light of a star comes from the side approaching us and the other half from the side receding, the spectrum lines will be broadened by Doppler effect. Unless, of course, its axis of rotation is pointed directly toward us. The particular lines in question, however, are sharp and clean cut in contrast to all the others. Another suspicious feature is that they are the powerful H and K lines of Ca II in the violet and the D lines of Na I in the yellow. Now when the atmosphere of a star is at a temperature of 25,000 degrees, there simply can't be enough of these atoms present to produce absorption. For when the temperature is that high, all the calcium and sodium would have been ionized up to Ca III and Na II. We are forcibly driven to the conclusion then that the lines have nothing to do with the star, but are caused by intervening clouds of sodium and calcium far outside of it, evidently in deep interstellar space.

This hypothesis was clinched by observations of such spectroscopic



binaries as 9 Camelopardalis and 62 Chi-2 Orionis. As the members of the System revolve around their center of gravity, the spectrum lines periodically show a Doppler shift to the red and violet—*except for the sharp lines of Ca II and Na I*. They refuse to share in the oscillations of the helium and hydrogen lines, but remain relatively fixed in position. Because of their unco-operative attitude, they have come to be known in the literature as "stationary" or "detached" lines. At first they were thought to be peculiar to spectroscopic binaries alone, but later they were recognized in hundreds of high-temperature stars.

THE NEXT question was whether the absorption arose from one cloud fairly close to the star or from isolated clouds scattered throughout the entire galaxy.

There is some direct observational evidence to support the former idea. Long exposure photographs of the Pleiades, for example, show them meshed in a nebulous web. With the spectroheliograph, the solar prominences can be seen stretching up into the chromosphere faster and faster, until they grow faint and vanish altogether. There is disagreement on the question of whether they disappear because they exceed the velocity of escape, or undergo a transformation that renders them invisible. But in any event, it is highly probable that the Sun is losing large amounts of calcium through radiation pressure and solar explosions. After ejection, they were assumed to become attached to the cloud so that they showed its motion instead of the star's. On this basis, the star throws out a sort of a smoke screen as it rushes through space.

A critical test was made by comparing the radial velocities of the stellar and detached lines, and by noting whether there was an increase of intensity with distance. The results were conclusive in favor of isolated clouds distributed throughout our system. Many stars showed differences in velocity amounting to 60 km per second, clear proof of no possible connection between star and cloud. And the relation between line intensity and distance turned out to be so good, it is now one of our handiest methods of getting distances of bright objects, such as galactic novae.

Stationary lines cannot be detected in stars later than B 3 because the temperature is low enough for true sodium and calcium lines to ap-

pear, which easily blot out the faint interstellar lines. They are still there, just strong enough to spoil radial velocity measurements.

THE characteristic that distinguishes scientists as a whole from the rest of mankind is their constant desire to upset the status quo. Unless it happens to be one of their own ideas, they are never content to get something firmly established and then leave it alone. And so after everyone was agreed about the interstellar sodium and calcium clouds, certain astronomers began to worry because interstellar lines of other elements had not been found. About three years ago they started an energetic attack on the problem, striking almost simultaneously on two different fronts. One party desired to detect new atoms in space by their absorption of the starlight passing through them. The other hoped to find evidence of light emitted from atoms in huge interstellar clouds covering hundreds of square degrees in the sky. In both cases success was due to "new weapons" far more effective than any ever employed before in this work.

The search for the absorption lines will be told first, as it proceeded along more familiar channels than the discovery of the emission lines, which brought out some of the weirdest-looking apparatus so far on record.

It seemed obvious that the search for such lines could be limited to rather abundant elements, and of these only their ultimate, rock-bottom lines were worth bothering about. Alone in the depths of space, an atom is in no position to pick and choose among the quanta passing by. Eddington has shown that the light from the whole galaxy received by us is roughly equal to

the radiation from 2,000 stars at a distance of 10 parsecs. This would give a density of energy corresponding to an effective temperature of 3 K; that is, a black-bulb thermometer suspended in space and in equilibrium with its surroundings would register 3 K. As a result, interstellar atoms are all down in their very lowest energy level, owing to lack of excitation. It may seem strange that calcium is found in the ionized state, but this is purely a photochemical and not a temperature effect. If an electron is lost, there is little hope of picking up another one again. As a matter of fact, almost all the interstellar calcium and sodium are in the Ca III and Na II state. It is only because their ultimate lines are so easily excited that we are aware of the minute amounts of Ca II and Na I present.

ANOTHER condition to be met is that the ultimate lines of the space elements must be between wave lengths 2,900 and 12,000 angstroms. The spectrum on the violet side is limited by the atmospheric ozone bands, and until our observatory on the Moon is functioning there is nothing anyone can do about it. At the other end, the dye zenocyanine has pushed the photographically observable infrared region out to about 12,000, and the search for new sensitizers goes on continually. But right now 2,900 and 12,000 mark the limits within which we are compelled to work.

These restrictions cut down the possibilities tremendously. Common elements like hydrogen, helium, silicon, carbon, and oxygen with their strongest lines in the ultraviolet are eliminated right at the start. In fact, very few elements are able to meet all the requirements. Out of the more than 100,000 spectrum

lines now known, only the following seemed likely to appear: 7,665 and 7,669 of K I, 4,227 of Ca I, 4,078 of Sr II, 3,643 of Sc II, 3,720 of Fe I, 3,994 of Al I, and several lines of Ti II near 3,300.

With the 200-inch mirror still in the optical shop, to find even these most favorable cases meant that our present instruments must be pushed to the limit, called upon to "play over their heads," as it were. Advantage would have to be taken of every detail in method and design that might be of the slightest aid.

The program was limited to five hand-picked stars already known to have exceptionally strong interstellar calcium and sodium lines. Included was one O-type and four supergiant B's, all distant objects, but so intensely luminous that all were brighter than apparent magnitude six.

The plates were taken at the coudé focus of the 100-inch reflector. The spectrograph consisted of a Schmidt camera of 32 inches focal length. By mounting it off-axis it was possible to have the plate holder outside of the incident beam so as not to obstruct the light. Absorption in the ultraviolet by the correcting lens was largely avoided by making it out of a thin piece of Vitaglass which gives good transmission down to 3,100. With a mirror for a collimator, the spectrograph was rendered nearly achromatic, and any region could be easily photographed by merely rotating the grating.

The observers were fortunate in securing a large plane grating of unusual brightness ruled on an aluminized Pyrex disk by R. W. Wood. This is the same Wood who got the navy to train seals during World War I for the purpose of tracking down submarines. The rulings were shaped so that light was concen-

trated in the first order red and the second order violet. This powerful combination of camera and grating, together with some fine grain contrasty emulsions, resulted in stellar spectra that are probably among the best ever obtained at this dispersion—about 10 angstroms per mm.

After suitable plates had been secured, the next step was to take them down to the office, where they could be examined under the measuring machine. Here again advantage was taken of every device that might aid in ferreting out the lines. One of the biggest obstacles encountered in work of this type is trying to decide whether a faint streak is a real spectrum line or just some silver grains that happen to lie in a row. This was mostly overcome by inserting a weak cylindrical lens above the microscope objective. Its action was such that defects and irregularities in plate grain showed as lines that crossed less than half the width of the spectrum, while genuine lines extended over the entire spectrum. Another test was to superpose two plates face to face and then slide them along each other. True lines stood out for a moment as the plates slid past the point where they coincided in wave length.

Out of the lines listed as good possibilities, the following were found: six lines of Ti II, the two lines of K I, and the line of Ca I in the blue.

Of these, the six lines of Ti II were by far the biggest prize. For a close study of the transitions involved led to a development no one could possibly have foreseen. It was evident that in addition to the six lines in the ultraviolet, the Ti II atom must also be emitting two lines in the far infrared impossible to produce in the laboratory—lines labeled *forbidden* in letters five feet high.

It was expected, of course, that the six lines would all arise from the ground state. But the ground state really consists of four sublevels very close together. And the six lines originate from the *lowest* sublevel of the *lowest* level in the atom. Not a trace could be found of lines from the next highest sublevel only 0.012 volts above the ground state.

Normally, there are 28 transitions allowed between the four sublevels and the strong triad, zDFG. But the fact that all but the lowest, or aF 3/2, level are inactive means that 15 of the 28 possible transitions are ruled out. The remaining 13 are shown in the diagram.

This greatly limits the changes the atom can make among the various energy states. For consider the variety of jumps it is free to make in a hot gas when all 28 are available. Suppose it has just made the transition from the aF 3/2 level to zD 5/2, and then dropped back to aF 5/2. Assume the atom desires to return to the ground state from where it came, just 0.012 volts away. But it cannot make this little leap directly, for the lifetime of aF 5/2 is 7 hours; that is, on the average 7 hours would have to pass before the atom would make this transition spontaneously. Now 7 hours is like an eternity in the life of an atom when something is happening to it every millionth of a second. No sooner does it reach one energy level than a collision with an atom or electron knocks it into another one. Or it is lifted to a higher state by absorbing a quantum from the stream of energy sweeping past. Thus the atom might get back to the ground level by jumping from aF 5/2 to zF 7/2, dropping down to aF 7/2, then going to zG 5/2, and from there finally making the transition back home to aF 3/2 by emitting the line 3,3883.

In general, an atom in the atmosphere of a star will spend most of its time giving and receiving energy, seldom remaining undisturbed for more than the tiniest fraction of a second.

In interstellar space, however, exactly the opposite conditions prevail. Consider again the situation confronting an atom that has made the transition of  $aF\ 3/2$  to  $zD\ 3/2$  to  $aF\ 5/2$ . The prospect of returning to  $aF\ 3/2$  by leaping from one level to another as before is now practically nil, for the necessary energy is nowhere forthcoming. The atom is in somewhat the same predicament as a motorist who has run out of gasoline on a lonely road in the middle of the night. The density of space is too low to make a collision likely for months or possibly years. Stellar radiation is so dilute that rescue by absorbing a quantum may be a matter of centuries. A million years might pass before a cosmic ray scores a direct hit. In fact, there is but one passage to the ground state still open—the little “forbidden” transition with a lifetime of 7 hours. Now this seems like an instant, as if time had been slowed down enormously. The impossibly difficult road in the atmosphere of a star becomes by far the quickest and easiest rout in interstellar space.

The quantum jumps between sublevels of the same term indicated by arrows in the diagram from  $aF\ 5/2$ — $aF\ 3/2$  and from  $aF\ 7/2$ — $aF\ 5/2$  produce emission lines at wave lengths 76,000 and 106,000 angstroms, almost out in the short-wave wireless region.

THE EXPERIENCE gained from the Ti II lines has been of the greatest value, for it has at least served as a sort of guide in unraveling some new data that at the present writing have

astrophysicists pretty well stopped.

In the beginning, they felt that putting their finger on the right interstellar lines to look for should be a fairly simple matter, since they would be ultimate lines of abundant elements and therefore as familiar as the members of their own family. But, as frequently happens, the way it turned out was not according to form at all. It is true that some of the predicted lines were found. But in addition, a whole batch of new ones turned up that nobody had ever heard of before.

There is nothing that arouses the bloodhound in an astrophysicist like a strange spectrum line produced under extreme conditions. They got out their catalogue of wave lengths and their tables of multiplets. Anything that looked hopeful was given thorough consideration. They even calculated frequencies from known energy relations within the atom. After a while some of them began to wonder. They were faced with the fact that apparently no one in the history of spectroscopy had ever observed these lines either in absorption or emission.

Then several people seemed to get the same idea at once. They argued, perhaps these aren't atomic lines at all. Perhaps they come from the next step up in the organization of matter—the diatomic molecule.

This would seem like grasping at straws if it were not for the knowledge already gained from Ti II. Molecular spectra, it will be recalled, are characterized by long series of bands often composed of hundreds of fine lines closely packed together. Their complexity arises from the wide variety of energy changes this dumbbell-shaped oscillator can make. In addition to undergoing changes in electron configuration similar to the atom, there are dozens

of ways the two atoms can vibrate, and hundreds of speeds with which they can rotate. These changes all going on at once produce the long columns of lines thousands of angstroms in length. The different bands overlap, and their lines intermingle and get generally tangled up together. Analyzing band spectra is one of the most formidable jobs in spectroscopy. Those who make their living that way form a little closed group with a language unintelligible to their associates, who generally regard them with much the same awe that one feels toward a time bomb disposal squad.

IN INTERSTELLAR space a molecule would be expected to behave in a manner corresponding precisely to the atom. That is, it would be in the lowest rotational level of the zero vibrational level of its ground electronic state. Instead of being able to absorb hundreds or even thousands of lines it is now reduced to two or three at the most.

The diatomic molecules most likely to occur are such ubiquitous compounds as OH, CH, NH, NaH, CO, and CN. Many hydrides would be expected since as we shall see later hydrogen is almost certainly the most abundant element of space.

A comparison of the lowest lines of these compounds with the interstellar lines has resulted in several tentative identification. CH looks especially good.

The evidence for the others is more uncertain. One line of CN and one of NaH agree well with interstellar lines, but there is always the danger of accidental coincidence when the identification rests with a single line. The case for NaH is strengthened a little by the fact that the two stars which show the suspected NaH line also have exception-

ally strong detached sodium lines.

But the most baffling lines of all are six that appear in the yellow just on the limit of visibility. In contrast to other interstellar lines, these are rather diffuse instead of sharp and narrow. Astronomers at first were doubtful how to classify them, but evidence of their interstellar origin is now conclusive. They definitely do not participate in the periodic shift of lines in the spectroscopic binary Boss 6,142, and they show a decided increase in intensity with distance.

So far not a single genuine clue to the origin of these lines exists. Their unusual width indicates they may be fragments of band spectra. Two of the lines are near calculated positions of carbon-dioxide bands. But a spectogram of Chi 2 Orionis which covers the Venus bands shows no absorption there, and the Venus bands should certainly be much stronger than any hypothetical bands of carbon dioxide in the yellow.

Attention has also been called to a fairly good agreement in position with a low-level line of molecular sodium, and the compound NaK. But so little is known of the structure of these bands that the question is still wide open.

A possibility that should not be overlooked is the absorption of light by solids. At room temperatures, solids ordinarily do not show narrow absorption lines, but near absolute zero many substances have sharp absorption lines that may be thought of as displaced atomic lines. Thus at 3 K clouds of dust particles or crystals in space might conceivably act as narrow absorbers.

This is the type of thing in which a person in a related field can sometimes make a contribution. Suggestions?

SPEAKING of a temperature of interstellar space of 3 K can be very dangerous unless everyone knows what kind of a "temperature" we mean. Temperature is so closely tied up in our minds with hot and cold that we are unable to view it in the same aloof way we do other thermodynamic functions, such as entropy. But in between the stars, temperature becomes little more than abstraction, a parameter in a formula to be juggled around until it fits the facts.

How easily the "temperature of interstellar space" can be twisted around to suit our purposes is shown by a recent report on the sodium clouds. The investigation was made in the hope of finding out something about their size and velocity from the width of the stationary D lines.

After testing and rejecting several hypotheses a combination was found at last that accounted for the observed width of the lines without doing too much damage to current astronomical belief. Briefly, the widths could be explained on the basis of sodium clouds with linear dimensions of the order of 700 parsecs, which shared in the rotation of the galaxy and also had velocities up to 20 km per second. The density was set at three billionths of an atom per cubic centimeter. And the temperature came out somewhat higher than the value of 3 K previously quoted—just 43,997 degrees higher to be exact. The difference, of course, depends upon whether you are referring to the temperature of the energy density of radiation or the velocities of the atoms themselves.

OUT of an investigation that started as a survey of a few faint nebulous patches with a small Schmidt camera, has come the discovery that in addition to the dark

clouds of space there are hundreds of square degrees of sky covered with very faintly luminous interstellar clouds. But so feeble is the light they emit that when attempts were made to photograph their spectrum in the usual way the lines were blotted out by the general illumination of the night sky. Not until a new type of nebular spectrograph of unheard-of dimensions was developed was the amazing extent of these clouds revealed. By their study, elements in space have been found which were impossible to catch by the stationary-line method.

The clouds were discerned originally on direct photographs taken with an emulsion having a narrow band of high sensitivity at the red H Alpha line of hydrogen. It was previously known that these nebulosities emitted this line, and by using a special plate combined with a suitable filter, practically all the scattered skylight was eliminated, leaving only the light of H Alpha. In this way background fog was prevented, but the nebular emission was transmitted freely, and contrast between nebula and sky thus greatly enhanced. The photographs showed strong nebulosity among the stars that was almost completely absent on exposures made in light of other colors.

More desirable than direct photographs, however, was a method of obtaining the spectra of the nebulosities. The instruments already on hand failed completely in this respect. What was needed most of all for this type of spectroscopy was speed. A very fast slit spectrograph was indicated with a short camera and strong dispersing units.

The instrument finally evolved to fill this need, which is now in use by the Macdonald Observatory, is a

150-foot nebular spectrograph built out in the open on a side of Mount Locke, Texas. It must cause the natives some tall speculation, for even an astronomer would be puzzled at his first glimpse.

The spectrograph is unique in that the slit is exposed directly to the sky; there is no large lens or mirror in the instrument. This method can be used to advantage when the object under observation covers an appreciable area in the sky, such as a nebula. And there is no collimating lens because the slit is so far from the prisms that the light is close enough to parallelism when it strikes the first prism face.

Reduced to bare essentials to avoid confusion of detail, the spectrograph consists of two piers set 75 feet apart on the side of a hill. The upper pier carries a stationary flat mirror 24 inches in diameter. Behind it is a large wooden shield to cut off surrounding skylight. This mirror faces down the hill in the direction of the south pole. Halfway between the two piers is another large shield with a square hole in the center that acts as a diaphragm.

On the lower pier is a polar axis to which is attached in very compact form the vital optical parts of the spectrograph. The first part to receive light from the sky is the "slit," which consists of a long plane mirror over which can be drawn two adjustable curtains. By moving the curtains back and forth, a long, rectangular section of the mirror can be secured varying in width from zero to ten inches. Light from this mirror or slit is reflected up the hill to the second fixed mirror, and from there back down to the other end of the pier. Here it is received by two quartz prisms which bend the

light or spectrum into a Schmidt camera of 94 mm. aperture. Also attached to the pier are guide telescopes, gears for orienting the mirror, a driving mechanism, et cetera.

WITH this odd-looking but powerful hillside spectrograph, 35 regions in the Milky Way have been explored. Perhaps the chief result, among others, is to emphasize the enormous abundance of hydrogen scattered throughout space. In the large star clouds of the Cygnus and Cepheus regions, faint hydrogen emission is found over hundreds of square degrees. Apparently the gas is excited by the ultraviolet radiation from the many hot stars in these densely populated areas. This is absorbed by the Lyman series of hydrogen raising the atoms to a higher energy state. In returning to the ground level, some of the atoms will not drop back directly, but by an intermediate transition will emit the red H Alpha line of the Balmer series. Other lines found besides those of hydrogen are the forbidden line of O II at 3,727 and in rare cases lines of O III as well.

The inhabitants of space now make up a fairly good-sized group, with others undoubtedly to be added in the future. Here is the census according to the latest count, which is admittedly of a highly uncertain nature.

This is the population per cubic meter:

Hydrogen atoms.....	8,000,000
Electrons .....	7,000,000
Na .....	103
K .....	5
Ca .....	3
Ti.....	One atom per
	50 cubic meters



## ECCENTRIC ORBIT

By D. B. Thompson

*The planet had an eccentric orbit, but for the two would-be conquerors of Earth, it had advantages. Minerals—a type of semi-intelligent life—But—the life was eccentric, too, in its own way—*

Illustrated by Schneeman

TARG stirred restlessly and cuddled closer to the furry side of his mother. A blast of icy air swirled into the

tiny cubbyhole, striking Targ's moist, tender snout. He whimpered protestingly, and clung tighter to the

warm, motionless bulk beside him.

But he could sleep no longer. Something stirred deep within him—the age-old urge of his race to be up and doing at this season was not to be denied. Even as he raised his emaciated body from the fur-lined cubby, his mother stirred beside him and sat upright. She twisted her head about, gazing with her huge saucer eyes into the thin, biting wind. Then she saw that for which she searched—a faint glimmer of light shining through the ice-locked entrance to the great communal cave. Spring had come to the world of the Tah-Shree.

Swiftly the season advanced on the little world. While ice still covered shaded areas, exuberant plant life sprang up, growing with phenomenal speed, as though impelled by some driving urge, some pressing necessity to reach maturity in the least possible time.

Targ and his mother, Rrul, were no longer thin and weak; food carefully stored the preceding summer had taken care of that. Targ seemed to be partaking of the same rushing growth as the plants, for this was the "year of growth" for thirteen-year-old Targ. Already, new, strange thoughts and feelings filled his being as he observed his childhood playmate, Gura, who, in her eleventh summer, was also undergoing the rapid and bewildering changes of the "year of growth."

Now they were basking lazily in the warm sun, talking idly in their harsh, rasping speech. There was nothing needing their attention. They could, if they liked, search for the bright stones, some colored, some a dazzling white, with living images of the warm god pulsing within their icy interiors. But already they had many of these stored in the cunningly concealed cave near the

"Place of Gods." And soon their period of inactivity must end. The spring harvest would begin then, the first of two harvests which occurred annually on their world.

"Mother," asked Targ, "do you think there is any truth in the old stories of emissaries from the warm god coming to our land in queer, flying caves? It is said that the caves are made of heavy, shiny material, such as we find in our deep caves and pound into trays for serving the gods. But the material of the flying caves is hard—too hard to shape by pounding. It is like the lumps which we pile around the altar. I think such heavy things could not fly."

"Oh, Targ! It is forbidden to say such things," gasped Gura.

"But, Gura—"

"Gura is right, son," chided Rrul. "Remember, I am the elder priestess of the warm god. I will not have you blaspheme."

"Mother Rrul!" interrupted Gura. "Someone comes. I feel his thoughts. It is Grak. He thinks that— Look quickly! Toward the place in the sky where the home of the cold god shines at night! A flying cave is coming!"

"Well done, Gura," approved Rrul. "You will be a good younger priestess. I, too, feel the thoughts now."

"I see it!" exclaimed Targ in vast astonishment. "It shines like the home of the warm god."

As he spoke, Grak rushed into the clearing, his hands extended high in salute to the priestess, his long, prehensile tail holding a broad leaf with which he shaded his fixed, staring eyes as he gazed in awe at the fiery visitant.

"You have done well, Grak," said Rrul. "We know of the coming of the flying cave. You may call the tribe to the Place of Gods."

"Thank you, mother," answered Grak, filled with pride at the importance of his mission. "It shall be done."

"Why is it, mother," burst out Targ after Grak had left, "that we can sense the thoughts of all the members of the tribe, while they can feel each other's scarcely at all, and ours only when we will it?"

"It is a gift shared by all the descendants of the first priestess of the warm god. Only those having this gift can serve as priestess, or consort with a priestess."

"But what about Gura?" asked Targ. "She is not a descendant of the first priestess."

"It is a wise provision of the warm god," said Rrul seriously, "that in every generation there shall be some outside our own family who have this gift. Such ones also become servants of the warm god." She gazed fondly at the two youngsters. It was not by chance that from earliest childhood Targ's only constant companion had been Gura.

The trio continued to watch the approaching flying cave. It was now discernible as a long, gleaming object, oddly difficult to see. Its surface was a shimmering, inconstant blur of faintly prismatic light.

"It is as the old legends describe it," admitted Targ, somewhat abashed as he remembered his recent doubts. "See, it is going to land near the Place of Gods."

"Come," commanded Rrul. "We must prepare to receive them."

THE TWO MEN climbed out of the spaceship. They were a strangely assorted pair. Tall, handsome Roger Dolman, one-time pilot for Earth-Mars Transport, might still have been in the control cabin of one of the huge vessels had it not been for a fight in a Martian dive in which,

accidentally, a fish-faced Venusian had died—the victim of a solid smash from Dolman's fist.

His companion, Dr. Rance Garmer, short, heavy, and nearly bald, had been a brilliant research physicist on the staff of the Three Worlds Institute of Advanced Research. One day, quite unobtrusively, he had walked out of the institute building, carrying with him a copy of the plans for a secret weapon and disappeared from the sight of man. Subsequently he had purchased a ship, hiring Dolman to act as pilot.

"Boy, this is great!" exclaimed Dolman, inhaling hugely. "Clouds, lakes, mountains, green plants—just like old Earth. No trees, though. I wonder why? Well, whoever that old spaceman was who crashed on Hector so long ago back in the Solar System, he sure didn't exaggerate any in describing this place. But imagine him making *this* trip in the kind of ship they had twelve hundred years ago!"

"I wish that part of the log dealing with the natives hadn't been destroyed," replied Garmer. "But we know they thought their visitor was an emissary from the Sun god. That information should help us a great deal."

"We could have used more information about the seasons, too," continued the pilot. "He seemed to think there was something rather peculiar about them. But that shouldn't bother us much. He was here quite a while, so we can probably stay here as long as we need to."

The two men did not wander far from their ship, and they kept their weapons handy, but they did not expect any danger. The half-indecipherable log they had found in the wrecked ship on the little asteroid had been specific on that point.

"Why are we so heavy, doc?" que-

ried Dolman. "This planet is no larger than Mars, but I feel almost as heavy as on Earth."

"Heavy metals, of course," replied Garmer, "just as the log said. This planet has a very high density, which offsets its small size in the matter of gravitational attraction. That is one reason why I selected it as the place to build the vibrator. The weapon requires a great deal of heavy metal of many kinds. We should find all we need here without much difficulty."

"Hey, listen, boss," interrupted the pilot. "Here comes the town band to welcome us."

Borne to their ears on the quiet air came a faint, insistent rhythm. Drums and rattles made up the background for a shrill, reiterative piping unlike anything they had ever heard.

"Here they come!" exclaimed Dolman. "What are they, anyway? I've seen some queer lookers in the Solar System, but nothing like *these* babies!"

"I think you have," replied Garmer, "in the Tropical Animals Preserve back on Earth. Little ratlike primates with huge fixed eyes. They are called tarsiers, and are quite generally supposed to be the direct ancestors of man, although many students of evolution deny this. Evidently on this planet they simply grew up, both in size and intelligence, without going through the intermediate steps of developing into men."

"Intelligence? Do you mean you think they are as intelligent as men?"

"Probably not, but they must have considerable intelligence to produce such music. But we shall soon know. Watch them closely, but don't do anything to stir up trouble."

The procession was worth watch-

ing. Old Rrul led the way, carrying in her hands a silvery tray on which were several piles of sparkling stones. Flanking her, but a half step behind, marched Targ and Gura, carrying trays of red and green stones. Each carried a huge leaf, held by their tails in such a manner as to shade Rrul from the sun. Beside them, in turn, walked two smaller youngsters, carrying leaves to shade Gura and Targ, and at the same time playing on long thin reeds from which came the elusive, reiterative piping which the two adventurers had previously heard. The rest of the tribe followed, marching three abreast. The center member of each rank carried a tray filled with purple or white crystals, or heaps of food. Beside them marched the musicians, carrying leaf shades and marking the rhythm with drums and rattles made from gourds.

"Look at those gems, doc," exclaimed Dolman. "Diamonds, rubies, and emeralds."

"I think you are right," assented Garmer. "They are probably much more plentiful here than on any of the three worlds."

"What are we waiting for, then?" demanded the pilot. "You wouldn't have passed up a chance like this back in the Solar System. We spent six months accumulating enough cash to equip this ship. These gems would be worth ten times as much as all we took in that time."

"The money we took during those six months was necessary to my plan. These jewels would be of no value to us here. You seem to forget that we made this long trip for just one purpose—to construct a vibrator. With that I can force the three worlds to come to my terms. Then I shall rule the System. What are a few paltry gems compared to that?"

"I still can't see it, doc," objected Dolman. "The three worlds all have

vibrators of their own, don't they? So the best we can get is a stalemate, isn't it?"

"Imbecile!" stormed Garmer. "Of course they have vibrators! But they will not dare use them because they would destroy their own worlds if they did. They will surrender to me because *they know that I will stop at nothing to gain my ends!*"

"O. K., doc. Don't get so excited—you'll be bursting a blood vessel one of these days." To himself he muttered, "Why did I ever team up with this megalomaniac, anyway? I'd be better off roughing it in the asteroids." Aloud he continued, "We had better pay a little attention to the monks. They seem to be getting restless."

DOLMAN was right. The clear, unshielded thoughts of the men had reached the brains of even the dull-est of the Tah-Shree. True, very little of it had been clear to them, but they had expected something very different from the emissaries of the warm god.

"Mother!" burst out Targ. "These are not—"

"Silence!" ordered Rrul sharply. "Do not doubt. Oh, my people," she continued, turning to the assembled tribe. "The emissaries think thoughts we understand not in order to test our faith. Let us place our offerings at their feet."

Suiting her actions to her words, she placed the tray of gems at the feet of Roger, saluted with both hands, and withdrew. As she backed ceremoniously away and others took her place, the pilot, with a bewildered look on his face, began to speak, accompanying his words with unmistakable gestures.

"The sun god is pleased with his people," he orated in ringing tones. He pointed to the setting sun, then

to the assembled Tah-Shree. "He is thankful for the offerings of the stones of ice with the image of the god himself burning within them. He is thankful, too, for the red stones and the green, for the pointed crystals and the white and purple, and for the foods from your stores." He pointed in turn to the diamonds, rubies, emeralds, quartz crystals, and the food, as the natives placed their offerings before him. The doctor stared at him in astonishment, but said nothing.

"Go, now," continued Dolman, pointing to the natives, then waving his arms in the direction from which they had come. "Come back again when the god is highest in his heaven." He pointed to the sun, swung his arms around in a circle and pointed to the zenith. "Then by our magic powers we shall send your offerings to the sun god." He touched the gems, then made a motion as if hurling them toward the sun.

Rrul, Gura, and Targ stepped forward, saluted with both hands; then, with arms upraised, turned to the waiting tribe.

"Hah-yah! Hah-yah! Hah-yah!" roared the natives in unison. Their god was pleased, and they were happy. Forgotten were the troublesome, half-perceived thoughts which had reached them when they had first entered the valley. They tramped rapidly away, talking excitedly in their harsh, hissing speech of the wonders they had beheld, and were to behold on the morrow.

Garmer looked at his big companion curiously. "You certain put that over very well. I think they actually understood the meaning of your gestures. How did you happen to think of it?"

"I . . . I don't know exactly," confessed Dolman with a sheepish

grin. "It just seemed to come to me. I felt for a moment that I really *was* a representative of their god."

"Don't be ridiculous!" snapped Garmer. "You fooled the natives, all right, but don't think you can fool me."

"I don't think so, doc. You know I wouldn't try to fool *you*, anyway."

"You promised to send the offerings to the sun god, too," continued Garmer. "How do you propose to keep that promise?"

"I've been thinking about that. It will be easy enough. We'll use a big signal rocket. Dump some stones in the space around the flare mechanism and shoot the rocket up about twenty miles, straight at the sun. When the flare goes off the monks will think the offerings have reached the sun."

"Yes. That should work very well. We shall do it."

"Shall we send all the stuff up in the rocket?" asked Roger, watching Garmer closely as he spoke. "You said yourself that we would have no use for the gems here."

"Since they gave us the jewels, we would be foolish to throw them away," replied Garmer stiffly. "Put in only the quartz crystals. The others may be of value to us when we return to our own worlds."

Roger grinned but said nothing.

IN THE MEANTIME, Rrul and the two young Tah-Shree had reached the entrance to the big cave. Targ had kept silent, as his mother had ordered, while they were in the presence of the men and the other members of the tribe. Now, as they sat in the twilight, he was bursting with curiosity.

"Why did you pretend to believe that those visitors from the sky are emissaries from the warm god?" he demanded.

"Perhaps, my son, they really do come from the warm god," replied Rrul.

"Then why did they think those strange thoughts about three worlds far, far away? Why did they speak of taking the holy stones for themselves? Why did they talk of destroying the people of those worlds with a great magic which would shake a whole world to pieces? Why did they talk of making that magic weapon *here*?"

"Perhaps they sent those thoughts to test us, as I told our people," persisted the old priestess.

"No, mother, for then you would not have *dared* to place those thoughts in the mind of the big one about the warm god being pleased, and about sending the stones to him, if you really believed the visitors were sent here by the warm god!"

"Very good, Targ," approved Rrul.

"And Targ was partly right about the old legends, too," put in Gura. "For, before we reached the place of their flying cave the big one spoke of another who came here long, long ago, and who was killed when he landed on a tiny world called Hector, far away. It is very strange to think of other worlds than ours, inhabited by strange beings, all doing wonderful things. Perhaps even if these visitors are *not* emissaries, we could learn much from them if they would but teach us."

"Perhaps they *will* teach us," replied Rrul enigmatically.

THE WARM GOD had journeyed across the sky twenty times since the coming of the flying cave. Under the leadership of Rrul, Targ and Gura, the way of life of the Tah-Shree had undergone a radical change, brought about by the coming of the visitors from space.

Targ walked forward to meet Dol-

man as the latter came down the long ramp leading into the depths of the cave. Down here, great lumps of heavy, hard metal—too hard for the natives to use—could be found in abundance.

"Where are the miners?" demanded Roger, speaking slowly as he struggled with the harsh, uncouth speech of the Tah-Shree.

"Rahzhuh tests Targ's faith," responded the youngster quickly. "Rahzhuh knows that today is the beginning of the first harvest. The food must be gathered at once, for the burning time, when the warm god comes close to the land of his people, is very near. And because Rahzhuh and Bawz have made us we-bars and kars, the harvest will be easy this year. The Tah-Shree are very grateful to Rahzhuh and Bawz."

Dolman shrugged and retraced his steps toward the large side cave in which the Earthmen were living. A strange thought had come to him with increasing frequency of late. It sometimes seemed that, instead of using the natives for their own purposes, he and Garmer were actually being used by them in some unfathomable plan of their own.

Targ stopped at the entrance to the compartment. "Targ will remain outside," he stated. "It is very dull for Targ when Rahzhuh and Bawz speak in the language of the gods. Targ cannot understand the strange words."

"Hm-m-m, I wonder," muttered Dolman. "I'm not so sure of that."

Garmer looked up in surprise as his big pilot entered. "Why aren't you at the mine?" he snapped.

"Bawz is only having his little joke," replied Dolman with a grin. "He knows that it's time for the first harvest, which must be finished quickly, because our celestial master,

the warm god, is getting all het up. The burning time is about due. Oh, yeah—Targ sends the thanks of the tribe for the wheelbarrows and carts, which will be a big help in the harvest."

"Why didn't you make them work?" demanded Garmer. "What do we care about their harvest? I need—"

"You need their labor," interrupted Dolman sharply. "Without it you can't do a thing. The monks can't work without food—and I happen to know that they have enough for only a few days."

"All right," replied Garmer testily. "I suppose you are right. But the work is going too slowly. This burning time must be midsummer. That means we haven't much time before winter. And some of the last steps

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in constructing the vibrator must be carried on in the open—too dangerous in an inclosed space. There must be no more delays!”

“We might speed things up a bit by assembling a couple more atomotors and mounting them so as to pull a train of cars,” suggested Dolman. “Targ and that girl friend of his, Gura, could probably handle them satisfactorily. They are a smart pair of youngsters, even if they are only a couple of owl-eyed monkeys.”

“Do it at once. Of course Targ and Gura can handle them. Any boy of ten back on Earth can build and operate a turbine-type atomotor.”

“Sure, doc. It is a lot different from the old days. I read once that the first atomic-power plant was built in the center of a mountain a mile through for protection from hard radiation. And it took a dozen or so atomic engineers to run it. Even then they took a swell chance of getting killed.”

DOLMAN had been right. Targ and Gura could handle the trains easily. They presented a strange sight—two long-tailed, saucer-eyed primates, driving the atomotor-powered, all-metal trains through the tortuous, sloping tunnel which led to the deep mines as calmly as if they had lived all their lives amid the wonders of the distant civilized worlds of the Solar System.

Their conversation would have interested Dolman very much had he been there to hear it. For one thing, much of it was in garbled English, although neither of the men had ever heard them use over twenty English words—the names of tools and articles which had no equivalent in Tah-Shree. The long breaks in oral speech, which did not seem to interrupt the conversation at all, would have interested Roger, too, for he

wondered occasionally at the facility with which he had learned Tah-Shree under the tutelage of Targ and Gura. Often, he was sure, they had furnished him with a needed word almost before he was sure himself that he needed it. But most of all, he would have been interested in the turn taken by the conversation itself. It would have proved a striking confirmation of some of his own half-formed ideas.

“Targ,” asked Gura, “why does Mother Rrul let the men make our people work so hard? The Tah-Shree used to be free and happy, picking fruits, hunting bright stones, dancing to the music of drums and pipes, growing strong and healthy in the life-giving rays from the abode of the warm god. Now they dig and pound and shovel all day in the dark caves to get the hard metal that Bawz wants. And he uses it to make a magic weapon to force his own people to work for him when he goes back!”

“I used to wonder, too, Gura. But I think I know now. These wonderful trains have convinced me that she is right. Mother wants the Tah-Shree to grow into a mighty race—as great as that of men. But no race can become great if they spend all their time playing like little children. Mother wants our people to learn to work. She thinks that when we have learned to work as men work, we, too, can make the magic tools to do our work for us. Tools like this train. Just think how much *kargsh* we could haul with this train! In one load we could bring as much to the caves as all the tribe could carry—enough to feed the entire tribe for many, many days.”

“But, Targ,” objected Gura, “think how much work was needed to get the hard metal to make this train and how many atomblast heat-



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ers and strange tools Rahzhuh had to make in order to shape the parts. As much work was done in building the train as would be needed to carry a trainload of *kargsh* to the caves in our baskets."

"But the train will last for many, many harvests. Only the atomotor needs to be rebuilt, and you know how easy that is. And today Rahzhuh is making a strange kind of pick which is driven by an atomotor. He calls it a drill. I think he can make many other tools to run in the same way. You have seen some of the wonderful things Bawz works with. And we know, now, that these things are really not magic at all; they are just tools men make to lighten their work. Some day we shall make such things ourselves."

"Why doesn't Mother Rrul tell our people all this? They still think they are serving the warm god," said Gura.

"They are serving the warm god," declared Targ. "Perhaps, as the members of the tribe believe, he even sent the men here to help us, although they think we are serving them."

"Why, I believe you are right, Targ," exclaimed Gura admiringly. "Some day the Tah-Shree shall fly to the world of men as these men flew to ours."

DOLMAN AND GARMER stood on the natural balcony in the great central cavern, miles underground, watching the proceedings below them; the former with genuine interest, the latter with fuming, ill-concealed impatience. Only Dolman's insistence that it was absolutely necessary had led him to come at all. As usual, Targ had assured Rahzhuh that, as emissaries of the warm god, he and Bawz knew all about the cere-

mony, and then had naïvely proceeded to tell them all about it.

"Today," he had said reverently, "the warm god comes closest to the land of his people. Tonight we thank him for his bounty and celebrate the start of his return toward the home of the cold god. We are very glad that his emissaries are here to help us worship."

"It was one hundred and ninety-seven Fahrenheit outside this afternoon," Dolman was saying now. "Midsummer! And what a summer! It must rain a yard every night, when the temperature drops to a mere one hundred forty. Then it all evaporates the next day, only to come pouring down again the next night. We're sure lucky to be down in these cool caves."

"Cool!" sputtered Garmer. "Do you call one hundred fifteen cool?"

"Relatively so, yes. If you didn't have that air conditioner that I fixed up in your laboratory with Targ's help, it would be at least one hundred forty in there, so close to the surface," said Dolman. "Quit crabbing."

The event had now reached its climax—the age-old ceremony depicting the withdrawal of their fiery deity. But in one respect, at least, the present ceremony differed from any of its predecessors; for, in place of the traditional torches, the participants carried their miner's headlamps, fed by the undying fires of atomic disintegration.

Old Rrul, solemn and majestic in the barbaric trappings of the elder priestess, advanced to bring the period of celebration to its close. She made a speech to the assembled Tah-Shree, a speech extolling the wondrous gifts brought by the emissaries. As she finished she raised her hands.

"Hah-yah! Hah-yah! Hah-yah!

The warm god is good!" roared the tribe in unison.

"Go, now," she concluded, "to your caves. Tomorrow you must work again in the deep places, for Bawz needs much shining rock for his work."

"Old fuzzy is pretty smart," observed Dolman as the men made their way back to their quarters. "Some of the monks have been grumbling about the hard going; now they will work harder than ever." To himself he added, "I wonder why she does it? I'm almost certain the old monks know we are not representatives of the sun god, yet she apparently does everything she can to help us."

AS THE DAYS passed, the temperature slowly dropped. The terrific storms became less violent, and finally ceased altogether. With incredible speed, new and different vegetation sprang up to replace that which had disappeared during the terrible heat of the burning time. Except for raised and rocky areas, the space about the caves became an impenetrable mass of writhing, twisting plant life, drawing sustenance from the putrescent remains of the spring growth. Even the path from the cave mouth to the spaceship was barred by the surging, living sea.

The Tah-Shree were openly jubilant.

"The second harvest will be very large," Targ exulted as he and Roger stood at the cave entrance, gazing at the extraordinary growth. "My people praise the warm god daily and give thanks to him for sending Bawz and Rahzhuh to us. You have brought us great good fortune."

Dolman, however, paid little attention to Targ's words. It was becoming increasingly important that

Garmer know how much time remained in which to complete the vibrator, and the pilot was at a loss to find a way to ask about it. The excuse of "testing the faith" of the obviously faithful natives was growing a little thin. Yet as emissaries of the warm god, the men were supposed to know the answer to all such questions. Then, as usual, Targ solved the problem by volunteering the information.

"When the warm god has hidden his face twenty more times we shall begin the second harvest," he said. "But we need not hurry this time, and only a few of the people will be needed. There will still remain thirty sleeps after the harvest begins before the cold god begins changing the water to rock."

"So, doc," reported Dolman a little later, "we have fifty more of these eighteen-hour days before the first freeze. And I'll make you a little bet right now that it cools off plenty fast here after that. This planet has the most cockeyed climate I ever ran into."

"The time is growing short, then," answered Garmer. "I must have more platinum and iridium at once, too. For the last three days I haven't received a gram of either one."

"I know it," responded Dolman, but these monks still can't seem to tell one metal from another. They are all either soft or hard to them; so, whenever they get any hard metal, it goes into one car, and soft goes into the other. It is rather strange, though, that they always seem to drop off on something just when you need it most. Do you suppose that they can . . . er . . . that is, maybe they don't want us to get the vibrator built in time, and—"

"Nonsense! They don't even know what we are doing! Even if

they did, they would surely rather have us leave than stay, so that they can go back to their own way of living. You have read too many of those wild magazines of interstellar adventure for your own good. Now get back to the mines and see that I get the metals I need."

"O. K., doc. You're still the boss, but I think you are wrong this time."

As TIME passed, it became increasingly evident that the vibrator would not be ready to assemble until long after the first ice formed. Garmer grew steadily more irritable and snapped at Dolman at the least excuse. Yet it would be hard to place the blame on the hard-working natives. They were producing more metal than ever as they became more familiar with the strange new tools made for them by Dolman with the aid of Targ and Gura. Invariably, however, there was a deficiency of whatever element was most needed.

And now even Dolman, who had never cared at all whether or not the vibrator was built, began to lose his temper as he contemplated spending the winter on the little planet. He loved a crowd.

"How about starting on the fuel, doc?" he demanded one day. "It won't do any good to complete the vibrator if we can't take off for home when we get it finished."

"We must finish the weapon before it gets too cold," retorted Garmer. "If you take part of the natives now to mine the material for the fuel, it will delay finishing the vibrator at least two weeks, and that will be too long. After it is finished, all the natives working together can mine all the fuel we need in three days. Now get back down there and see that I get the supplies I need."

Dolman went, muttering angrily to himself and cursing the day he had

signed up as pilot for Garmer.

But his troubles were far from ended. Suddenly, for no apparent reason, a series of small mishaps began to occur. Gura's train broke down twice, blocking the route to the mines completely each time for a period of half a day. Three atomotor drills were rendered useless when the shafts suddenly grew red-hot and jammed the mechanism irreparably. During the night a fall of rock from an important shaft of the mine completely blocked that passage.

"Bawz and Rahzhuh will stay with us while the warm god is away?" inquired Targ innocently one day.

Dolman swore luridly, and for the fourth time in an hour examined the thermometer outside the cave entrance. It read -30 F. He returned to his task of making more atomblast heaters.

The Tah-Shree were working only half time now in spite of all the two men could do. They were eating vast quantities of food and growing so fat that, even when working, they could accomplish very little. For six days Garmer stormed and raged, demanding just a small quantity of molybdenum, which had, at one time, seemed more than plentiful. Dolman shouted and cursed, but it had not the slightest effect.

"Rahzhuh makes a fine joke," observed Targ after an especially vile bit of profanity on Dolman's part. "Rahzhuh knows that the Tah-Shree must go to sleep very soon to await the return of the warm god. It is good of Rahzhuh to make jokes for the Tah-Shree."

Dolman gave up after that.

"It's SIXTY below outside, doc," Dolman reported. "Snow has been falling without a let-up for ten days. You say it will take ten more days to complete the vibrator—the last five

outside the cave. With a dozen heaters going we couldn't keep a big enough place clear of snow to assemble that thing. You might as well quit crabbing and forget about going back before spring."

"I am already aware of that fact," replied Garmer. "I have come to the conclusion that it is better so. If we had gone back too quickly, the police of the three worlds would still have been looking for us. If we spend the winter here they will think we have been lost in space. With the advantage of a surprise attack, we can take over the government of the Solar System without a struggle."

"Have you any idea how long the winter lasts here?" queried Dolman.

"No. Why? And what difference does it make?"

"Well, the seasons here are due to the eccentricity of the orbit, like those of Mercury. The farther the planet gets from the Sun, the slower it will travel, so we can expect winter to be longer than summer—how much longer will depend on how far the planet gets from the Sun. We could have found the necessary data to determine all that by taking a series of observations during the summer, but we didn't do it because we didn't expect to stay here. We couldn't possibly take any shots of the Sun now because it never stops snowing. But I would guess that winter must be at least two or three times as long as the summer."

"All the better. That will give the three worlds all the more time to forget us."

"It may get cold enough to liquefy the air," pointed out Roger.

"Don't be ridiculous!" snapped Garmer. "The natives live through the winter."

"Yeah, but they hibernate. That is why they don't know how long the cold season lasts."

"What difference will it make to



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AT ALL NEWSSTANDS

us as long as we have plenty of atomblast heaters? Even if the air freezes, we can still get plenty of it in these heated caves."

But Garmer figured without the natives. Ten days had passed—ten days during which the temperature just inside the entrance to the big cave had dropped to -120 F. Targ, hugging a small atomblast heater to his breast, glanced at the thermometer, which Dolman had taught him to read long ago, and turned toward the cave where the men were sleeping. He knew it must be much colder outside, for many heaters had been running in the caverns. But only five were functioning now, although the men did not know it. There were three in the laboratory where the men slept, and one in the cubby which Targ was sharing for the last time with old Rrul, and the one he carried.

Shielding his tiny light carefully, he crept into the laboratory and turned off the three heaters there and carried them with him to his sleeping place. He extinguished the last two heaters.

"It is very strange, mother," he mumbled sleepily, "but I caught it clearly in the minds of both the sleeping men. Without the atomblasts, when the cold god comes very near, they will die."

A SPINDLY-LEGGED, barrel-chested giant sat before the televiser in Martes, capital of the Martian Federation. He glanced at a chronometer and flicked a tiny switch. Instantly the faces of an Earthman and a Venusian appeared on the screens before him; instantly, because, carefully synchronized, the waves carrying the images had started on their way some minutes before.

"Gentlemen, I have here an excerpt from the report of the first Interstellar Exploration Expedition, just received. As you know, the observed course of the ship carrying Dr. Garmer and his accomplice, Roger Dolman, could have led to but one destination, the star listed on Martian charts as R-5-23. The report shows that this star has one planet, with an orbit of cometary character. Orbital period is 3.82 Martian years, observed temperature at aphelion, very low, with oxygen, nitrogen and inert gases present in liquids or solid state. Estimated temperature at perihelion, 200° F.

"Obviously, gentlemen, no intelligent life is possible under such extremes of temperature. We know that Garmer and Dolman could not have had sufficient fuel to reach any other planet, nor enough to return to the Solar System. Therefore we may conclude that we have seen the last of them. That is all, gentlemen."

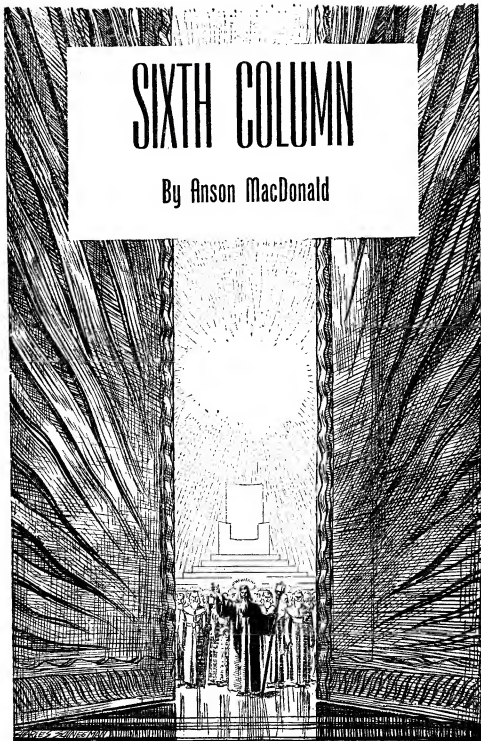
THE biting cold wind struck Targ's tender snout, but he did not whimper. During the "year of growth," he had attained his full height of five feet. He was no longer a child.

Feebly he crawled from the tiny cubbyhole and started the atomblast heater near the entrance. Someone stirred in the next small cave. A dreamy, glad light appeared in Targ's great eyes. Starting another heater, he carried it quickly to Gura's cave. This was to be his "year of mating."

Old Rrul looked down at the glowing heater. "This summer," she said softly, "the Tah-Shree shall work for themselves. And with many heaters—who knows—perhaps we shall learn to stay awake even during the reign of the cold god."

# SIXTH COLUMN

By Anson MacDonald



# SIXTH COLUMN

By Anson MacDonald

**Concluding a three-part novel of America conquered and unconquered by an unconventional army of halo-wearing tricksters!**

Illustrated by Schneeman

The blitzkrieg of the Pan-Asian Empire destroyed the United States government so rapidly and so completely that no surrender was involved. All that remains of legal government activity is the Citadel, a military research laboratory hidden under the Rockies, and manned by Major Ardmore, in command as the only remaining line officer; Colonel Calhoun, mathematician; Dr. Brooks, biochemist; Dr. Wilkie, physicist; Brevet Lieutenant Thomas, Sergeant Scheer, master mechanic, and Graham, cook and former artist. The rest of the personnel were killed in the catastrophic discovery of complete atomic power—power, transmutation, gravity control, selective death ray—in short the key secret that makes the solution of other problems in physics simple, a general solution of unified field.

They have a powerful weapon, but no army to use it.

They dare not use it themselves for fear of brutal reprisal against the helpless civilian populace, a people stripped of their freedom, registered, deliberately degraded. Their one chance to assemble is in church, as the Pan-Asians have heeded history and not interfered with local religions—well-behaved slaves require religion.

Ardmore plans an uprising patterned after the "Fifth Columns" that destroyed European democracy, this to be a Sixth Column of patriots. He suggests the formation of a new religion as a means of building an organization undetected by the overlords. Calhoun—irascible and unstable outside of his mathematical genius—opposes it, but Ardmore diplomatically persuades him, as his genius is indispensable to the plan.

They build up the cult of Mota, with the mother temple overlying and concealing the Citadel, with branch temples throughout the country. The priests are commissioned in the United States army and recruit for it. Each priest is equipped with an ornate, symbolic staff of office which is actually a

powerful portable atomic power generator and projector, a strong weapon both in defense and attack. The temples cannot be entered by those of Mongolian blood because of the highly selective action of a lethal screen at each portal; concealed under each temple is a headquarters equipped with paradio communication.

The cult of Mota cultivates the complacent approval of the Pan-Asians by strict superficial compliance with their regulations and by aiding in the economic consolidation of the conquered country—they are open-handed with gold.

At the same time they conduct an insidious indirect attack on the morale of the invaders—a morale based on Oriental "face." The mysterious powers, of the priests, totally foreign to the otherwise excellent science of the Asiatics, shakes their all-important feeling of superiority and the increasing self-respect of the whites makes them nervous.

The Prince Royal decides to arrest the High Priest, Ardmore. He surrenders and uses it as a means of still further upsetting the war lords. While he is under arrest a concerted raid is made on all temples; the priests submit meekly to arrest. That night, Ardmore and all his priests mysteriously and simultaneously break jail, using the powers concealed in each priestly staff. Ardmore takes shelter in the local temple in the Pan-Asian capital for much needed sleep. He is awakened by an urgent call from the Citadel; the Pan-Asians are rounding up the congregations of Mota.

They are faced with the immediate prospect of a mass slaughter of innocents, which the time factor leaves them helpless to prevent.

## PART III.

ARDMORE understood Thomas' fear; he felt it himself. But he did not permit his expression to show it. "Take it easy, old son," he said

in a gentle voice. "Nothing has happened to our people yet—and I don't think we'll let anything happen."

"But, Chief, what are you going to do about it? There aren't enough of us to stop them before they kill a lot of people."

"Not enough to do it directly, perhaps, but there is a way. You stick to collecting data and warn everybody not to go off half-cocked. I'll call you back in about fifteen minutes." He flipped the disconnect switch before Thomas could answer.

It required some thought. If he could equip each white man with a staff, it would be simple. The shielding effect from a staff could theoretically protect a man against almost anything; except, perhaps, the infiltration of poison gas. But the construction and repair department had been hard pushed to provide enough staffs to equip each new priest; one for each white man was out of the question, since they lacked factory mass production. Anyhow, he needed them now—this morning.

A priest could extend his shield to include any given area or number of people, but in great extension the field became so tenuous that a well-thrown snowball would break through it. Nuts!

He realized suddenly that he was thinking of the problem in direct terms again, in spite of his conscious knowledge that such an approach was futile. What he wanted was psychological jujitsu—some way to turn their own strength against them. Misdirection—that was the idea! Whatever it was they expected him to do, don't do it! Do something else.

But what else? When he thought he had found an answer to that question he called Thomas to the reflectophone. "Jeff," he said at once, "give me Circuit A."

He spoke for some minutes to his priests, slowly and in detail, and emphasizing certain points. "Any questions?" he then asked, and spent several more minutes in dealing with such as they were relayed in from the diocese stations.

ARDMORE and the local priest left the temple together. The priest attempted to persuade him to stay behind, but he brushed the objections aside. The priest was right; he knew in his heart that he should not take personal risks that could be avoided, but it was a luxury to be out from under Jeff Thomas' restraining influence.

"How do you plan to find out where they have taken our people?" asked the priest. He was a former real-estate operator named Ward, a man of considerable native intelligence. Ardmore liked him.

"Well, what would you do if I weren't along?"

"I don't know. I suppose I would walk into a police station and try to scare the information out of the flat-face in charge."

"That's sound enough. Where is one?"

The central police station of the Pan-Asian police lay in the shadow of the palace, between eight and nine blocks to the south. They encountered many Pan-Asians en route, but were not interfered with. The Asiatics seemed dumfounded to see two priests of Mota striding along in apparent unconcern. Even those garbed as police appeared uncertain what to do, as if their instructions had not covered the circumstance.

However, someone had phoned ahead; they were met on the steps by a nervous Asiatic officer who demanded of them, "Surrender! You are under arrest!"

They walked straight toward him.

Ward lifted one hand in blessing and intoned, "Peace! Take me to my people."

"Don't you understand your own language?" snapped the Pan-Asian, his voice becoming shrill. "You are under arrest!" His hand crept nervously toward his holster.

"Your earthly weapons avail you not," said Ardmore calmly, "in dealing with the great Lord Mota. He commands you to lead me to my people. Be warned!" He continued to advance until his personal screen pushed against the man's body.

It—the disembodied pressure of the invisible screen—was more than the Pan-Asian could stand. He fell back a pace, jerked his sidearm clear and fired point-blank. The vortex ring struck harmlessly against the screen, was absorbed by it.

"Lord Mota is impatient," remarked Ardmore in a mild tone. "Lead his servant, before the Lord Mota sucks the soul from your body." He shifted to another effect, never before used in dealing with the Pan-Asians.

The principle involved was very simple; a cylindrical tractor-pressor stasis was projected, forming in effect a tube. Ardmore let it rest over the man's face, then applied a tractor beam down the tube. The unfortunate Pan-Asian gasped for air where there was no air and pawed at his face. When his nose began to bleed, Ardmore let up on him. "Where are my children?" he inquired again as softly as before.

The police officer, probably in sheer reflex, tried to run. Ardmore nailed him with a pressor beam against the door and again applied momentarily the suction tube, this time to the fellow's midriff. "Where are they?"

"In the park," the man gasped, and regurgitated violently.

They turned with leisured dignity and headed back down the steps, sweeping those who had pressed too close casually out of the way with the pressor beam.

THE PARK surrounded the erstwhile State capitol building. They found the congregation herded into a hastily erected bull pen which was surrounded by ranks of Asiatic soldiers. On a platform nearby, technicians were installing television pick-up. It was easy to infer that another public "lesson" was to be given the serfs. Ardmore saw no evidence of the rather bulky apparatus used to produce the epileptogenetic ray; either it had not been brought up, or some other method of execution was to be used—perhaps the soldiers present were an enormous firing squad.

Momentarily he was tempted to use the staff to knock out all the soldiers present—they were standing at ease with arms stacked, and it was conceivably possible that he might be able to do so before they could harm, not Ardmore, but the helpless members of the congregation. But he decided against it; he had been right when he gave his orders to his priests—this was a game of bluff; he could not combat *all* of the soldiers that the Pan-Asian authorities could bring to bear, yet he must get this crowd of whites safe inside the temple.

The massed white people in the bull pen recognized Ward, and perhaps the high priest as well; at least by reputation. He could see sudden hope wipe despair from their faces—they surged expectantly. But he passed on by them with the briefest of blessing, Ward in his train, and hope gave way to doubt and bewilderment as they saw him stride up to the Pan-Asian commander and

offer him the same blessing.

"Peace!" cried Ardmore. "I come to help you."

The Pan-Asian barked an order in his own tongue. Two Pan-Asians ran up to Ardmore and attempted to seize him. They slithered off the screen, tried again, and then stood looking to their superior officer for instructions, like a dog bewildered by an impossible command.

Ardmore ignored them and continued his progress until he stood immediately in front of the commander. "I am told that my people have sinned," he announced. "The Lord Mota will deal with them."

Without waiting for an answer, he turned his back on the perplexed official and shouted, "In the name of Shaam, Lord of Peace!" and turned on the green ray from his staff.

He played it over the imprisoned congregation. Down they went, as if the ray were a strong gale striking a stand of wheat. In seconds' time, every man, woman, and child lay limp on the ground, to all appearance dead. Ardmore turned back to the Pan-Asian officer and bowed low. "The servant asks that this penance be accepted."

To say that the Oriental was disconcerted is to expose the inadequacy of language. He knew how to deal with opposition, but this wholehearted co-operation left him without a plan; it was not in the rules.

Ardmore left him no time to think of a plan. "The Lord Mota is not content," he informed him, "and directs that I give you and your men presents—presents of gold!"

With that he switched on a dazzling white light and played it over the stacked arms of the soldiers to his right. Ward followed his motions, giving his attention to the left flank. The stacked small arms

glowed and scintillated under the ray. Wherever it touched, the metal shone with a new luster, rich and ruddy. Gold! Raw gold!

The Pan-Asian common soldier was paid no better than common soldiers usually are. Their lines shifted uneasily, like race horses at the barrier. A sergeant stepped up to the weapons, examined one and held it up. He called out something in his own tongue, his voice showing high excitement.

The soldiers broke ranks.

They shouted and swarmed and danced. They fought each other for possession of the useless, precious weapons. They paid no attention to their officers; nor were their officers free of the gold fever.

Ardmore looked at Ward and nodded. "Let 'em have it!" he commanded, and turned his knockout ray on the Pan-Asian commander.

The Asiatic toppled over without learning what had hit him, for his agonized attention was on his demoralized command. Ward had gone to work on the staff officers.

Ardmore gave the American prisoners the counteracting effect while Ward disintegrated a large gate in the bull pen. There developed the most unexpected difficult part of the task—to persuade three hundred-odd dazed and disorganized people to listen and to move all in one direction. But two loud voices and a fixed determination accomplished it. It was necessary to clear a path through the struggling, wealth-mad Orientals with the aid of the tractor and pressor beams. This gave Ardmore an idea; he used the beams on his own followers much as a goose girl touches up a flock of geese with her switch.

They made the nine blocks to the temple in ten minutes, moving at a



*"When I give the signal by waking him," Major Ardmore explained, "we go into the act. The object is to scare him, make him lose face—but not kill him."*

dogtrot that left many gasping and protesting. But they made it, made it without interruption by major force, although both Ward and Ardmore found it necessary to knock out an occasional Pan-Asian en route.

Ardmore wiped sweat from his face when he finally stumbled in the temple door, sweat that was not due entirely to precipitate progress.

"Ward," he asked with a sigh, "have you got a drink in the place?"

THOMAS was calling him again before he had had time to finish a cigarette. "Chief," he said, "we are beginning to get some reports in. I thought you would like to know."

"Go ahead."

"It looks successful—so far.

Maybe twenty percent of the priests have reported so far through their bishops that they are back with their congregations."

"Any casualties?"

"Yes. We lost the entire congregation in Charleston, South Carolina. They were dead before the priest got there. He tore into the Pan-Asians with his staff at full power and killed maybe two or three times as many of the apes as they had killed white men before he beat his way back to his temple and reported."

Ardmore shook his head at this. "Too bad. I'm sorry about his congregation, but I'm sorrier that he cut loose and killed a bunch of the Pan-Asians. It tips my hand before I'm ready."

"But, Chief, you can't blame him—his wife was in that crowd!"

"I'm not blaming him. Anyhow, it's done—the gloves had to come off sooner or later; this just means that we will have to work a little faster. Any other trouble?"

"Not much. Several places they fought a sort of rear-guard action getting back to the temples and lost some whites." Ardmore saw a messenger in the screen hand a sheaf of flimsies to Thomas. Thomas glanced at them and continued, "A bunch more reports, Chief. Want to hear 'em?"

"No. Give me a consolidated report when they are all in. Or when most of them are in, not later than an hour from now. I'm cutting off."

The consolidated report showed that over ninety-seven percent of the members of the cult of Mota had been safely gathered into the temples. Ardmore called a staff meeting and outlined his immediate plans. The meeting was, in effect, face to face, as Ardmore's place at the conference table was taken by the

pick-up and the screen of the receiver. "We've had our hands forced," he told them. "As you know, we had not expected to start action of our own volition for another two weeks, perhaps three. But we have no choice now. As I see it, we have to act and act so fast that we will always have the jump on them."

He threw the situation open to general discussion; there was agreement that immediate action was necessary, but some disagreement as to methods. After listening to their several opinions, Ardmore selected Disorganization Plan IV and told them to go ahead with preparations. "Remember," he cautioned, "once we start, it's too late to turn back. This thing moves fast and accelerates. How many basic weapons have been provided?"

The "basic weapon" was the simplest Ledbetter projector that had been designed. It looked very much like a pistol and was designed to be used in similar fashion. It projected a directional beam of the primary Ledbetter effect in the frequency band fatal to those of Mongolian blood and none other. It could be used by a layman after three minutes' instruction, since all that was required was to point it and press a trigger, but it was practically fool-proof—the user literally could not harm a fly with it, much less a white man. But it was sudden death to Asiatics.

The problem of manufacturing and distributing quantities of weapons to be used in the deciding conflict had been difficult. The staffs used by the priests were out of the question; each was a precision instrument comparable to a fine Swiss watch. Scheer himself had laboriously fashioned by hand the most delicate parts of each staff and, nev-

ertheless, required the assistance of many other skilled metal smiths and tool makers to keep pace with the demand. It was all handwork; mass production was impossible until Americans once more controlled their own factories.

Furthermore, detailed instruction and arduous supervised practice were indispensable in order for a priest to become even moderately skillful in the use of the remarkable powers of his staff.

The basic weapon was the pragmatic answer. It was simple and rugged and contained no moving parts other than the activating switch, or trigger. Even so, it could not be manufactured in quantity at the Citadel, as there would have been no way to distribute the weapons to widely separated parts of the country without attracting unhealthy attention from the Pan-Asian authorities. Each priest carried to his own temple one sample of the basic weapon; it was then his responsibility to locate and enlist, in his own community, workmen with the necessary skill in metalwork for producing the comparatively simple device.

In the secret places down underneath each temple, workmen had been busy for weeks at the task—grinding, polishing, shaping, reproducing by hand row on row of the lethal little gadgets.

THE SUPPLY staff officer gave Ardmore the information he had requested. "Very well," Ardmore acknowledged, "that's fewer weapons than we have members of our congregations, but it will have to do. There will be a lot of dead wood, anyway. This damned cult business has attracted every screwball and crackpot in the country—all the long-haired men and short-haired

women. By the time we count them out we may have a few basic weapons left over. Which reminds me—if we do have any left over, there ought to be some women in every congregation who are young and strong and tough-minded enough to be useful in a fight. We'll arm them. "About the crackpots—you'll find a note in the general indoctrination plan as to how each priest is to break the news to his flock that the whole thing is really a hoax for military purposes; I want to add to it. Nine people out of ten will be overjoyed to hear the truth and strongly cooperative. That tenth one may cause trouble, get hysterical, maybe try to do a bunk out of the temple. Caution each priest, for God's sake to be careful, break the news to them in small numbers at a time, and be ready to turn the sleepy ray on anybody that looks like a source of trouble. Then lock 'em up until the fun is over—we haven't time to try to reorient the soft-minded.

"Now get on with it. The priests will need the rest of the day to indoctrinate their congregations and to get them organized into something resembling military lines. Thomas, I want the scout car assigned tonight to the job involving the Prince Royal to stop here first and pick me up. Have Wilkie and Scheer man it."

"Very well, sir. But I had planned to be in that car myself. Do you object to that slight change?"

"I do," Ardmore said dryly. "If you will look at Disorganization Plan IV you will see that it calls for the commanding officer to remain in the Citadel. Since I am already here, outside the Citadel, you will remain in my place."

"But, Chief—"

"We are not going to risk both of

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us, not at this stage of the game. Now pipe down."

"Yes, sir."

ARDMORE was called back to the reflectophone later that morning. The face of the headquarters communication watch officer peered out of the screen at him. "Oh—Major Ardmore, Salt Lake City is trying to reach you with a priority routing."

"Put them on."

The face gave way to that of the priest at Salt Lake City. "Chief," he began, "we've got a most extraordinary prisoner; I'm of the opinion you'd better question him yourself."

"I'm short of time. Why?"

"Well, he's a Pan-Asian, but claims he is a white man and that you will know him. The funny thing about it is that he got past our screen. I thought that was impossible."

"So it is. Let me see him."

It was Downer, as Ardmore had begun to suspect. Ardmore introduced him to the local priest and assured that official that his screens had not failed him. "Now, captain, out with it—"

"Sir, I decided to come in and report to you in detail because things are coming to a head."

"I know it. Give me all the details you can."

"I will, sir. I wonder if you have any idea how much damage you've done the enemy already—their morale is cracking up like rotten ice in a thaw. They are all nervous, uncertain of themselves. What happened?"

Ardmore sketched out briefly the events of the past twenty-four hours, his own arrest, the arrest of the priests, the arrest of the entire cult of Mota, and the subsequent delivery. Downer nodded. "That explains it. I couldn't really tell what

had happened; they never tell a common soldier anything—but I could see them going to pieces, and I thought you had better know."

"What happened?"

"Well—I guess I had better just tell you what I saw, and let you make your own inferences. The second battalion of the Dragon Regiment at Salt Lake City is under arrest. I heard a rumor that every officer in it had committed suicide. I suppose that is the outfit that let the local congregation escape, but I don't know."

"Probably. Go ahead."

"All I know is what I saw. They were marched in about the middle of the morning with their banners reversed and confined to their barracks, with a heavy guard around the buildings. But that's not all. It affects more than the one outfit under arrest. Chief, you know how an entire regiment will go to pieces if the colonel starts losing his grip?"

"I do. Is that the way they act?"

"Yes—at least the command stationed at Salt Lake City. I'm damn well certain that the big shot there is afraid of something he can't understand, and his fear has infected his troops, right down to the ordinary soldiers. Suicides, lots of 'em, even among the common soldiers. A man will get moody for about a day, then sit down facing toward the Pacific and rip out his guts."

"But here is the tip-off, the thing that proves that morale is bad all over the country. There has been a general order issued by the Prince Royal, in the name of the Heavenly Emperor, forbidding any more honorable suicides."

"What effect did that have?"

"Too soon to tell—it just came out today. But you don't appreciate what that means, Chief. You have to live among these people, as

I have, to appreciate it. With the Pan-Asians, everything is face—*everything*. They care more for appearances than a white man can possibly understand. To tell a man who has lost face that he can't balance the books and get square with his ancestors by committing suicide is to take the heart right out of him. It jeopardizes his most precious possession.

"You can count on it that the Prince Royal is scared, too, or he would never have resorted to any such measures. He must have lost an incredible number of his officers lately ever to have thought of such a thing."

"That is reassuring. Before this night is out, I think we will have damaged their morale at least as much more as we have already. So you think we've got them on the run?"

"I didn't say that, major—don't ever think so. These damned yellow baboons"—he spoke quite earnestly, evidently forgetting his own exact physical resemblance to the Asiatics—"are just about four times as deadly and dangerous in their present frames of mind as they were when they were cock o' the walk. They are likely to run amuck with just a slight push and start slaughtering whites right and left—babies, women—indiscriminately!"

"Hm-m-m. Any recommendations?"

"Yes, Chief, I have. Hit 'em with everything you've got just as soon as possible, and before they start in on a general massacre. You've got 'em softened up now—sock it to 'em!—before they have time to think about the general population. Otherwise you'll have a blood letting that will make the Collapse look like a tea party.

"That's the other reason I came

in," he added. "I didn't want to find myself ordered out to butcher my own kind."

DOWNER'S REPORT left Ardmore plenty to worry about. He conceded that Downer was probably right in his judgment of the workings of the Oriental mind. The thing that Downer warned against—retaliation against the civilian population—always had been the key to the whole problem—that was why the religion of Mota had been founded; because they dare not strike directly for fear of systematic retaliation against the helpless. Now—if Downer was a judge—in attacking indirectly, Ardmore had rendered an hysterical retaliation almost as probable.

Should he call off Plan IV and attack today?

No—it simply was not practicable. The priests had to have a few hours at least in which to organize the men of their flocks into guerrilla warriors. That being the case, one might as well go ahead with Plan IV and soften up the war lords still further. Once it was under way, the Pan-Asians would be much too busy to plan massacres.

A SMALL, neat scout car dropped from a great height and settled softly and noiselessly on the roof of the temple in the capital city of the Prince Royal. Ardmore stepped up to it as the wide door in its side opened and Wilkie climbed out. He saluted. "Howdy, Chief!"

"H'lo, Bob. Right on time, I see—just midnight. Think you were spotted?"

"I don't think so; at least, no one turned a spot on us. And we cruised high and fast; this gravitic control is great stuff." As they climbed in, Scheer gave his CO a brief nod accompanied by, "Evening, sir," with

his hands still on the controls. As soon as the safety belts were buckled he shot the car vertically into the air.

"Orders, sir?"

"Roof of the palace—and be careful."

Without lights, at great speed, with no power source the enemy could detect by eye or instrument, the little car plummeted to the roof designated. Wilkie started to open the door. Ardmore checked him. "Look around first."

An Asiatic cruiser, on routine patrol over the residence of the vice-royal, changed course and stabbed out with a searchlight. The beam felt around the roof and settled on the scout car.

"Can you hit him at this range?" inquired Ardmore, whispering unnecessarily.

"Easiest thing in the world, Chief." Cross hairs matched on the target; Wilkie depressed his thumb. Nothing seemed to happen, but the beam of the searchlight swept on past them.

"Are you sure you hit him?" Ardmore inquired doubtfully.

"Certain. That ship'll go ahead on automatic control till her fuel gives out—maybe a thousand miles. But it's a dead hand at the helm."

"O. K. Scheer, you take Wilkie's place at the projector. Don't let fly unless you are spotted. If we aren't back in thirty minutes, return to the Citadel. Come on, Wilkie—now for a little hocus-pocus."

Scheer acknowledged the order, but it was evident from the way his powerful jaw muscles worked that he did not like it. Ardmore and Wilkie, each attired in the full regalia of a priest, moved out across the roof in search of a way down. Ardmore kept his staff set and projecting in the wave band to which Mongolians

were sensitive, but at a power-level anaesthetic rather than lethal in its effect. The entire palace had been radiated with a cone of these frequencies before they had landed, using the much more powerful projector mounted in the scout car. Presumably every Asiatic in the building was unconscious—Ardmore was not taking unnecessary chances.

They found an access door to the roof, which saved them cutting a hole, and crept down a steep iron stairway intended only for janitors and repairmen. Once inside, Ardmore had trouble orienting himself and feared that he would be forced to find a Pan-Asian, resuscitate him, and wring the location of the Prince's private chambers out of him by most ungentle methods. But luck favored them; he happened on the right floor and correctly inferred the portal of the Prince's apartment by the size and nature of the guard collapsed outside of it.

The door was not locked; the Prince depended on a military watch being kept rather than keys and bolts—he had never turned a key in his life. They found him lying in his bed, a book fallen from his limp fingers. A personal attendant lay crumpled in each of the four corners of the spacious room.

Wilkie eyed the Prince with interest. "So that's his nibs. What do we do now, major?"

"You get on one side of the bed; I'll get on the other. I want him to be forced to divide his attention two ways. And stand up close so that he will have to look up at you. I'll talk all the business, but you throw in a remark or two every now and then to force him to split his attention."

"What sort of a remark?"

"Just priestly mumbo-jumbo. Im-

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"I think so—I used to sell magazine subscriptions."

"O. K. This guy is a tough nut—really tough. I am going to try to get at him with the two basic congenital fears common to everybody, fear of constriction and fear of falling. I could handle it with my staff, but it will be simpler if you do it with yours. Do you think you can follow my motions and catch what I want done?"

"Can you make it a little clearer than that?"

Ardmore explained in detail, then added, "All right—let's get busy. Take your place." He turned on the four colored lights of his staff. Wilkie did likewise. Ardmore stepped across the room and switched out the lights of the room.

WHEN the Pan-Asian Prince Royal, Grandson of the Heavenly One and ruler in his name of the Imperial Western Realm, came to his senses, he saw standing over him in the darkness two impressive figures. The taller was garbed in robes of shimmering, milky luminescence. His turban, too, glowed with a soft white light of its own, and floating over his head was a hoop of white fire—a halo.

The staff in his left hand streamed light from all four faces of its cubical capital—ruby, golden, emerald, and sapphire.

The second figure was like the first, save that his robes glowed ruddy like iron on anvil. The face of each was partially illuminated by the rays from their wands.

The figure in shining white raised his right hand in a gesture not benign, but imperious. "We meet again, O unhappy Prince!"

The Prince had been trained truly

and well; fear was not natural to him. He started to sit up, but an impalpable force shoved against his chest and thrust him back against the bed. He started to speak.

The air was sucked from his throat. "Be silent, child of iniquity! The Lord Mota speaks through me. You will listen in peace."

Wilkie judged it to be about time to divert the Asiatic's attention. He intoned, "Great is the Lord Mota!"

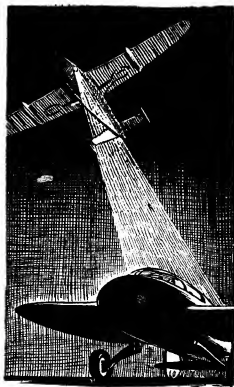
Ardmore continued, "Your hands are wet with the blood of innocence. There must be an end to it!"

"Just is the Lord Mota!"

"You have oppressed his people. You have left the land of your fathers, bringing with you fire and sword. You must return!"

"Patient is the Lord Mota!"

"But you have tried his patience," agreed Ardmore. "Now he is angry



with you. I bring you warning; see that ye heed it!"

"Merciful is the Lord Mota!"

"Go back to the place whence you came—go back at once, taking with you all your people—and return not again!" Ardmore thrust out a hand and closed it slowly. "Heed not this warning—the breath will be crushed from your body!" The pressure across the chest of the Oriental increased intolerably, his eyes bulged out, he gasped for air.

"Heed not this warning—you will be cast down from your high place!" The Prince felt himself suddenly become light; he was cast into the air, pressed hard against the high ceiling. Just as suddenly his support left him; he fell heavily back to the bed.

"So speaks my Lord Mota!"

"Wise is the man who heeds him!"

Wilkie was running short of choruses.

Ardmore was ready to conclude. His eye swept around the room and noted something he had seen before—the Prince's ubiquitous chess table. It was set up by the head of the bed, as if the Prince amused himself with it on sleepless nights. Apparently the man set much store by the game. Ardmore added a postscript. "My Lord Mota is done—but heed the advice of an old man: Men and women are *not* pieces in a game!" An invisible hand swept the costly, beautiful chessmen to the floor. In spite of his rough handling, the Prince had sufficient spirit left in him to glare.

"And now my Lord Shaam bids you sleep." The green light flared up to greater brilliance; the Prince went limp.

"Whew!" sighed Ardmore. "I'm glad that's over. Nice co-operation, Wilkie—I was never cut out to be an actor." He hoisted up one side of his robes and dug a package of

cigarettes out of his pants pocket. "Better have one," he offered. "We've got a really dirty job ahead of us."

"Thanks," said Wilkie, accepting the offer. "Look, Chief—is it really necessary to kill everybody here? I don't relish it."

"Don't get chicken, son," admonished Ardmore with an edge in his voice. "This is war—and war is no joke. There is no such thing as humane war. This is a military fortress we are in; it is necessary to our plans that it be reduced completely. We couldn't do it from the air because the plan requires keeping the Prince alive."

"Why wouldn't it do just as well to leave them unconscious?"

"You argue too much. Part of the disorganization plan is to leave the Prince still alive and in command, but cut off from all his usual assistants. That will create a turmoil of inefficiency much greater than if we had simply killed him and let their command devolve to their number two man. You know that. Get on with your job."

With the lethal ray from their staffs turned to maximum power, they swept the walls and floor and ceiling, carrying death to Asiatics for hundreds of feet—through rock and metal, plaster and wood. Wilkie did his job with white-lipped efficiency.

Five minutes later they were carving the stratosphere for home—the Citadel.

Eleven other scout cars were hurrying through the night. In Cincinnati, in Chicago, in Dallas, in major cities across the breadth of the continent they dove out of the darkness, silencing opposition where they found it, and landed little squads of intent and resolute men. In they went, past sleeping guards, and

dragged out local senior officials of the Pan-Asians—provincial governors, military commanders, the men on horseback. They dumped each unconscious kidnaped Oriental on the roof of the local temple of Mota, there to be received and dragged down below by the arms of a robed and bearded priest.

Then to the next city to repeat it again, as long as the night lasted.

CALHOUN buttonholed Ardmore almost as soon as he was back in the Citadel. "Major Ardmore," he announced, clearing his throat, "I have waited up to discuss a matter of import with you."

This man, Ardmore thought, can pick the damndest times for a conference. "Yes?"

"I believe you expect a rapid culmination of events?"

"Things are coming to a head, yes."

"I presume the issue will be decided very presently. I have not been able to get the details I want from your man Thomas—he is not very co-operative; I fail to see why you have thrust him up to the position of speaking for you in your absence—but that is beside the point," Calhoun conceded with a magnanimous gesture. "What I wanted to say is this: Have you given any thought to the form of government after we drive out the Asiatic invader?"

What the devil was the man getting at? "Not particularly—why should I? Of course, there will have to be a sort of provisional interim period, military government of sorts, while we locate all the old officials left alive and get them back on the job and arrange for a national election. But that ought not to be too hard—we'll have the local priests to work through."

Calhoun's eyebrows shot up. "Do you really mean to tell me, my dear man, that you are seriously contemplating returning to the outmoded inefficiencies of elections and all that sort of thing?"

Ardmore stared at him. "What else are you suggesting?"

"It seems obvious. We have here a unique opportunity to break with the stupidities of the past and substitute a truly scientific rule, headed by a man chosen for his ability and scientific training rather than for his skill in catering to the prejudices of the mob."

"Dictatorship, eh? And where would I find such a man?" Ardmore's voice was disarmingly, dangerously gentle.

Calhoun did not speak, but indicated by the slightest of smug self-deprecatory gestures that Ardmore would not have far to look to find the right man.

Ardmore chose not to notice Calhoun's implied willingness to serve. "Never mind," he said, and his voice was no longer gentle, but sharp. "Colonel Calhoun, I dislike to have to remind you of your duty—but understand this: You and I are military men. It is not the business of military men to monkey with politics. You and I hold our commissions by grace of a constitution, and our sole duty is to that constitution. If the people of the United States want to streamline their government, they will let us know!"

"In the meantime, you have military duties, and so do I. Go ahead with yours."

Calhoun seemed about to burst into speech. Ardmore cut him short. "That is all. Carry out your orders, sir!"

Calhoun turned abruptly and left.

Ardmore called his Chief of Intelligence to him. "Thomas," he said,

"I want a close, but discreet, check kept on Colonel Calhoun's movements."

"Yes, sir."

"THE LAST of the scout cars are in, sir."

"Good. How does the tally stand now?" Ardmore asked.

"Just a moment, sir. It was running about six raids to a ship—with this last one that makes a total of . . . uh . . . nine and two makes eleven—seventy-one prisoners in sixty-eight raids. Some of them doubled up."

"Any casualties?"

"Only to the Pan-Asians—"

"Damn it—that's what I meant! No, I mean to our men, of course."

"None, major. One man got a broken arm when he fell down a staircase in the dark."

"I guess we can stand that. We should get some reports on the local demonstrations—at least from the East coast cities—before long. Let me know."

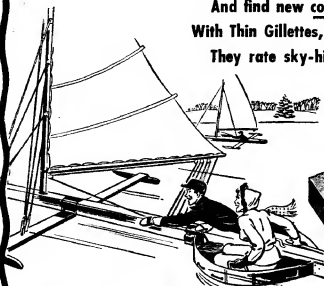
"I will."

"Would you mind telling my orderly to step in as you leave. I want to send for some caffeine tablets—better have one yourself; this is going to be a big day."

"A good notion, major." The communications aid went out.

IN SIXTY-EIGHT cities throughout the land, preparations were in progress for the demonstrations that constituted Phase 2 of Disorganization Plan IV. The priest of the temple in Oklahoma City had delegated part of his local task to two men, Patrick Minkowski, taxi driver, and John W. (Jack) Smyth,

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retail merchant. They were engaged in fitting leg irons to the ankles of the Voice of the Hand, Pan-Asian administrator of Oklahoma City. The limp, naked body of the Oriental lay on a long table in a workshop down under the temple.

"There," announced Minkowski, "that's the best job of riveting I can do without heating tools. It'll take him a while to get it off, anyway. Where's that stencil?"

"By your elbow. Captain Isaacs said he'd weld those joints with his staff after we finished; I wouldn't worry about them. Say, it seems odd to call the priest Captain Isaacs, doesn't it? Do you think we're really in the army—legally, I mean?"

"I wouldn't know about that—and as long as it gives me a chance to take a crack at those flat-faced apes, I don't care. I suppose we are, though—if you admit that Isaacs is an army officer, I guess he can take recruits. Look—do we put this stencil on his back or on his stomach?"

"I'd say to put it on both sides. It does seem funny, though, about this army business, I mean. One day you're going to church; the next you're told it's a military outfit, and they swear you in."

"Personally, I like it," commented Minkowski. "Sergeant Minkowski—it sounds good. They wouldn't take me before on account o' my heart. As for the church part, I never took any stock in this great god Mota business, anyhow; I came for the free food and the chance to breathe in peace." He removed the stencil from the back of the Asiatic; Smyth commenced filling in the traced design of an ideograph with quick-drying indelible paint. "I wonder what that heathen writing means?"

"Didn't you hear?" asked Smyth, and told him.

A delighted grin came over Minkowski's face. "Well, I'll be damned," he said. "If anybody called me that, it wouldn't do him no good to smile when he said it. You wouldn't kid me?"

"No, indeed. I was in the communications office when they were getting the design from the mother temple—I mean general headquarters. Here's another funny thing, too. I saw the chap in the screen who was passing out the design, and he was Asiatic as this monkey"—Smyth indicated the unconscious Voice of the Hand—"but they called him Captain Downer and treated him like a white man. What do you make of that?"

"Couldn't say. He must be on our side, or else he wouldn't be loose in headquarters. What'll we do with the rest of this paint?"

Between them they found something to do with it, which Captain Isaacs noticed at once when he came in to see how they were progressing. He suppressed a smile. "I see you have elaborated on your instructions a bit," he commented, trying to keep his voice soberly official.

"It seemed a pity to waste the paint," Minkowski explained innocently. "Besides, he looked so naked the way he was."

"That's a matter of opinion. Personally, I would say that he looks nakeder now. We'll drop the point; hurry up and get his head shaved. I want to leave any time now."

MINKOWSKI and Smyth waited at the door of the temple five minutes later, the Voice of the Hand rolled in a blanket on the floor between them. They saw a sleek duocycle station wagon come shooting up to

the curb in front of the temple and brake to a sudden stop. Its bell sounded, and Captain Isaacs' face appeared in the window of the driver's compartment. Minkowski threw down the butt of a cigarette and grabbed the shoulders of the muffled figure at their feet; Smyth took the legs and they trotted clumsily and heavily out to the car.

"Dump him in the back," ordered Captain Isaacs.

That done, Minkowski took the wheel while Isaacs and Smyth crouched in the back with the subject of the pending demonstration.

"I want you to find a considerable gathering of Pan-Asians almost anywhere," directed the captain. "If there are Americans present, too, so much the better. Drive fast and pay no attention to anyone. I'll take care of any difficulties with my staff." He settled himself to watch the street over Minkowski's shoulder.

"Right, captain! Say, this is a sweet little buggy," he added as the car shot forward. "How did you pick it up so fast?"

"I knocked out a few of our yellow friends," answered Isaacs briefly. "Watch that signal!"

"Got it!" The car slewed around and dodged under the nose of oncoming cross traffic. A Pan-Asian policeman was left futilely waving at them.

A few seconds later Minkowski demanded, "How about that spot up ahead, captain?" and hooked his chin in the indicated direction. It was the square of the civic center.

"O. K." He bent over the silent figure on the floor of the car, busy with his staff.

The Asiatic began to struggle. Smyth fell on him and pinned the blanket more firmly about the head and shoulders of their victim. "Pick

your spot. When you stop, we'll be ready."

The car lurched to a stomach-twisting halt. Smyth slammed open the rear door; he and Isaacs grabbed corners of the blanket and rolled the now-conscious official into the street. "Take it away, Pat!"

The car jumped forward, leaving startled and scandalized Asiatics to deal with an utterly disgraceful situation as best they might. Twenty minutes later a brief but explicit account of their exploit was handed to Ardmore in his office at the Citadel. He glanced over it and passed it to Thomas. "Here's a crew with imagination, Jeff."

Thomas took the report and read it, then nodded agreement. "I hope they all do as well. Perhaps we should have given more detailed instructions."

"I don't think so. Detailed instructions are the death of initiative. This way we have them all striving to think up some particularly annoying way to get under the skins of our slant-eyed lords. I expect some very amusing and ingenious results."

By nine a. m., headquarters time, each one of the seventy-odd Pan-Asian major officials had been returned alive, but permanently, unbearably disgraced, to his racial brethren. In all cases, so far as the data at hand went, there had been no cause given to the Asiatics to associate their latest trouble directly with the cult of Mota. It was simply catastrophe, psychological catastrophe of the worst sort, which had struck in the night without warning and without trace.

"You have not set the time for Phase 3 as yet, major," Thomas reminded Ardmore when all reports were in.

"I know it. I don't expect it to be more than two hours from now at the outside. We've got to give them a little time to appreciate what has happened to them. The force of demoralization will be many times as great when they have had time to compare notes around the country and realize that *all* of their top men have been publicly humiliated. That, combined with the fact that we crippled their continental headquarters almost to the limit, should produce as sweet a case of mass hysteria as one could wish. But we'll have to give it time to spread. Is Downer on deck?"

"He's standing by in the communications watch office."

"Tell them to cut in a relay circuit from him to my office. I want to listen to what he picks up here."

Thomas dialed with the interoffice communicator and spoke briefly. Very shortly Downer's pseudo-Asiatic countenance showed on the screen above Ardmore's desk. Ardmore spoke to him. Downer slipped an earphone off one ear and gave him an inquiring look.

"I said, 'Are you getting anything yet?'" repeated Ardmore.

"Some. They're in quite an uproar. What I've been able to translate is being canned." He flicked a thumb toward the microphone which hung in front of his face. A preoccupied, listening look came into his eyes, and he added, "San Francisco is trying to raise the palace—"

"Don't let me interrupt you," said Ardmore, and closed his own transmitter.

"—the Emperor's Hand there is reported dead. San Francisco wants some sort of authorization— Wait a minute; the comm office wants me to try another wave length. There it comes—they're using the Prince

Royal's signal, but it's in the provincial governor's frequency. I can't get what they're saying; it's either coded or in a dialect I don't know. Watch officer, try another wave band—I'm just wasting time on that one. . . . That's better." Downer's face became intent, then suddenly lit up. "Chief, get this: Somebody is saying that the governor of the gulf province has lost his mind and asks permission to supersede him! Here's another—wants to know what's wrong with the palace circuits and how to reach the palace—wants to report an uprising—"

Ardmore cut back in. "Where?"

"Couldn't catch it. Every frequency is jammed with traffic, and about half of it is incoherent. They don't give each other time to clear—send right through another message."

There was a gentle knock at the outer door of Ardmore's office. It opened a few inches and Dr. Brooks' head appeared. "May I come in?"

"Oh—certainly, doctor. Come in. We are listening to what Captain Downer can pick up from the radio."

"Too bad we haven't a dozen of him—translators, I mean."

"Yes, but there doesn't seem to be much to pick up but a general impression." They listened to what Downer could pick up for the better part of an hour, mostly disjointed or partial messages, but it was made increasingly evident that the sabotage of the palace organization, plus the terrific emotional impact of the disgrace of key administrators, had played hob with the normal, smooth functioning of the Pan-Asian government. Finally Downer said, "Here's a general order going out— Wait a minute— It orders a radio silence on all clear—"

speech messages; everything has to be coded."

Ardmore glanced at Thomas. "I guess that is about the right point, Jeff. Somebody with horse sense and poise is trying to whip them back into shape—probably our old pal, the Prince. Time to stymie him." He rang the communications office. "O. K., Steeves," he said to the face of the watch officer, "give them power!"

"Jam 'em!"

"That's right. Warn all temples through Circuit A, and let them all do it at once."

"They are standing by now, sir. Execute?"

"Very well—execute!"

Wilkie had developed a simple little device whereby the tremendous power of the temple projectors could be rectified, if desired, to undifferentiated electromagnetic radiation in the radio frequencies—static. Now they cut loose like sunspots, electrical storms, and aurora, all hooked up together.

Downer was seen to snatch the headphones from his ears. "For the love o'— Why didn't somebody warn me?" He reapproached one receiver cautiously to an ear, and shook his head. "Dead. I'll bet we've burned out every receiver in the country."

"Maybe so," observed Ardmore to those in his office, "but we'll keep jamming them just the same." At that moment, in all the United States, there remained no general communication system but the paradio of the cult of Mota. The Asiatic rulers could not even fall back on wired telephony; the obsolete ground lines had long since been salvaged for their copper.

"How much longer, Chief?" asked Thomas.

AST—10

"Not very long. We let 'em talk long enough for them to know that something hellacious is happening all over the country. Now we've cut 'em off. That should produce a feeling of panic. I want to let that panic have time to ripen and spread to every Pan-Asian in the country. When I figure they are ripe, we'll sock it to 'em!"

"How will you tell?"

"I can't. It will be on hunch, between ourselves. We'll let the little darlings run around in circles for a while, not over an hour, then give 'em the works."

Dr. Brooks nervously attempted to make conversation. "It certainly will be a relief to have this entire matter settled once and for always. It's been very trying at times—" His voice trailed off.

Ardmore turned on him. "Don't ever think we can settle things 'once and for always.'"

"But surely—if we defeat the Pan-Asians decisively—"

"That's where you are wrong about it." The nervous strain he was under showed in his brusque manner. "We got into this jam by thinking we could settle things once and for always. We met the Asiatic threat by the Non-Intercourse Act and by big West coast defenses—so they came at us over the north pole!

"We should have known better; there were plenty of lessons in history. The old French Republic tried to freeze events to one pattern with the Versailles Treaty. When that didn't work they built the Maginot Line and went to sleep behind it. What did it get them? Final blackout!

"Life is a dynamic process and can't be made static. '—and they all lived happily ever after' is fairy-tale stu—" He was interrupted by the jangling of a bell and the red

flashing of the emergency transparency.

The face of the communications watch officer snapped into view on the reflectophone screen. "Major Ardmore!"

It was gone and replaced by the features of Frank Mitsui, contorted with apprehension. "Major!" he burst out. "Colonel Calhoun—he's gone crazy!"

"Easy, man, easy! What's happened?"

"He gave me the slip—he's gone up to the temple. He thinks he's the god Mota!"

ARDMORE cut Frank off by switching to the communications watch officer. "Get me the control board in the great altar—move!"

He got it, but it was not the operator on watch that Ardmore saw. Instead it was Calhoun, bending over the console of controls. The operator was collapsed in his chair, head lolled to the right. Ardmore cut the connection at once and dived for the door.

Thomas and Brooks competed for second place, leaving the orderly a hopelessly outdistanced fourth. The three swept up the gravity chute to the temple level at maximum acceleration, and slammed out onto the temple floor. The altar lay before them, a hundred feet away.

"I assigned Frank to watch him," Thomas was trying to say when Calhoun stuck his head over the upper rail of the altar.

"Stand fast!"

They stood. Brooks whispered, "He's got the heavy projector trained on us. Careful, major!"

"I know it," Ardmore acknowledged, letting the words slip out of one side of his mouth. He cleared his throat. "Colonel Calhoun!"

"I am the great Lord Mota. Careful how you speak to me!"

"Yes, certainly, Lord Mota. But tell thy servant something—isn't Colonel Calhoun one of your attributes?"

Calhoun considered this. "Sometimes," he finally answered, "sometimes I think that he is. Yes, he is."

"Then I wish to speak to Colonel Calhoun." Ardmore eased forward a few steps.

"Stand still!" Calhoun crouched rigid over the projector. "My lightnings are set for white men—take care!"

"Watch it, Chief," whispered Thomas, "he can blast the whole damn place with that thing."

"Don't I know it!" Ardmore answered voicelessly, and started to resume the verbal tight-rope walk. But something had diverted Calhoun's attention. They saw him turn his head, then hastily swing the heavy projector around and depress its controls with both hands. He raised his head almost immediately, seemed to make some readjustment of the projector, and depressed the controls again. Almost simultaneously some heavy body struck him; he fell from sight behind the rail.

On the floor of the altar platform they found Calhoun struggling. But his arms were held, his legs pinioned by the limbs of a short stocky brown man—Frank Mitsui. Frank's eyes were lifeless china, his muscles rigid.

It took four men to force Calhoun into an improvised strait jacket and to carry him down to sick bay. "As I figure it," said Thomas, watching the work party remove their psychotic burden, "Dr. Calhoun had the projector set to kill white men. The first blast didn't harm Frank, and he had to stop to reset the controls. That saved us."

"Yes—but not Frank."

"Well—you know his story. That second blast must have hit him while he was actually in the air—full power. Did you feel his arms? Coagulated instantaneously—like a hard-boiled egg."

BUT they had no time to dwell on the end of little Mitsui's tragic life; more minutes had passed. Ardmore and company hurried back to his office, where he found Kendig, his chief of staff, calmly handling the traffic of dispatches. Ardmore demanded a quick verbal resumé.

"Only one change, major—they tried to bomb the temple in Nashville. Didn't damage it, naturally, but wrecked the buildings all around it. Have you set the zero hour? Several dioceses have inquired."

"Not yet, but very soon. Unless

you have some more data for me, I'll give them their final instructions right away on Circuit A."

"No, sir, you might as well go ahead."

When Circuit A was reported back as ready, Ardmore cleared his throat. He felt suddenly nervous. "Action in twenty minutes, gentlemen," he started in, "I want to review the main points of the plan." He ran over it; the twelve scout cars were assigned one each to the twelve largest cities, or, rather, what was almost the same list, the twelve heaviest concentrations of Pan-Asian military power. The attack of the scout cars would be the signal to attack on the ground in those areas.

The scout cars, with one exception, were poised even as he spoke,

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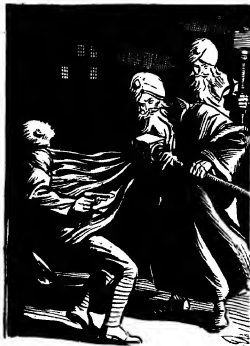
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in the stratosphere over their objectives.

The heavy projectors mounted in the scout cars were to inflict as much quick damage as possible on military objectives on the ground, especially barracks and air fields. Priests, being nearly invulnerable, would supplement them on the ground, as would the projectors in the temples. The "troops" made up from the congregations would harry and hunt. "Tell them when in doubt to shoot, and shoot first. Don't wait to see the whites of their eyes. The basic weapons are good for thousands of activations without recharging, and they can't possibly hurt a white man with them. Shoot anything that moves!

"Also," he added, "tell them not to be alarmed at anything strange. If it looks impossible, one of our boys is responsible; we specialize in miracles!

"That's all—good hunting!"

His last precaution referred to a special task assignment for Wilkie, Graham, Scheer, and Downer. Wilkie had been working on some special effects, with Graham's artistic collaboration. The task in battle required a team of four, but was not a part of the regular plan. Wilkie himself did not know just how well it would work, but Ardmore had assigned a scout car to them and had given them their head in the matter.

His striker had been dressing him in his robes as he spoke. He settled his turban in place, checked his personal paradio hook-up with the communications office, and turned to say good-bye to Kendig and Thomas. He noticed a queer look in Thomas' eyes, and felt his neck turn red. "You want to go, don't you, Jeff?"

Thomas did not say anything. Ardmore added, "Sure—I'm a heel. I know that. But only one of us can go to this party, and it's going to be me!"

"You've got me wrong, Chief—I don't like killing."

"So? I don't know that I do, either. Just the same, I'm going out and finish Frank Mitsui's bookkeeping for him." He shook hands with both of them.

THOMAS GAVE the signal of execution before Ardmore reached the Pan-Asian capital city. His pilot set him down on the roof of the temple there after the fighting in the capital had commenced, then gunned his craft away to take up his own task assignment.

Ardmore looked around. It was quiet in the immediate neighborhood of the temple; the big projector in the temple would have been seen to that. He had seen one Pan-Asian cruiser crash while they were landing, but the speedy little scout car

assigned to that task he had not been able to notice. He went down inside the temple.

It seemed deserted. A man was standing near a duocycle car parked garagelike on the temple floor. He came up and announced, "Sergeant Bryan, sir. The priest—I mean Lieutenant Rogers—told me to wait for you."

"Very well, then—let's go." He climbed into the car. Bryan put his little fingers to his lips and whistled piercingly.

"Joe!" he shouted. A man stuck his head over the top of the altar. "Going out, Joe." The head disappeared; the great doors of the temple opened. Bryan climbed in beside Ardmore and asked, "Where to?"

"Find me the heaviest fighting—or, rather, Pan-Asians, lots of them."

"It's the same thing." The car trundled down the wide temple steps, turned right and picked up speed.

The street ran into a little circular parkway set with bushes. There were four or five figures crouched behind those bushes, and one sprawled prone on the ground. As the car slowed, Ardmore heard the sharp *ping!* of a vortex rifle or pistol—he could not tell which—and one of the crouching figures jerked and fell.

"They're in that office building," yelled Bryan in his ear.

He set his staff to radiate a narrow, thin wedge and fanned the beam up and down the building. The pinging noise stopped. An Asiatic dashed out a door that he had not yet touched and fled up the street. Ardmore cut the beam and used another setting, aiming at the figure by means of a thin bright

beam of light. The light touched the man; there was a dull, heavy boom and the man disappeared. In his place was a great oily cloud which swelled and dispersed.

"Jumping Judas! What was that?" Bryan demanded.

"Colloidal explosion. I released the surface tension of his body cells. We've been saving it for this day."

"But what made him explode?"

"The pressure in his cells. They can run as high as several hundred pounds. But let's go."

The next few blocks were deserted of all but bodies; however, Ardmore kept his projector turned on and swept the buildings they passed as systematically as the speed would allow. He took advantage of the lull to call headquarters. "Any reports yet, Jeff?"

"Nothing much yet, Chief. It's too soon."

THEY SHOT out into the open before Ardmore realized where Bryan was taking him. It was the State university campus on the edge of the city, now used as barracks by the imperial army. The athletic fields and golf course adjoining had been turned into an airport.

Here for the first time he realized clearly how pitifully few were the Americans whom he had armed to destroy the Pan-Asians. There appeared to be a skirmish line of sorts in position off to the right; he could see the toll they were taking of the Asiatics. But there were thousands of the yellow men, enough to engulf the whites by sheer multitude. Damn it, why hadn't the scout car assigned reduced this place. Had it met with a mishap?

He decided that the crew of the scout car had been kept busy with aircraft, too busy to clean out the barracks. He thought now that he

should have fought city by city, using all available scout cars as a unit, and trusting to the jamming of the radio to permit him to do it that way. Was it too late now to change? Yes—the gage was thrown, the battle was on all over the country. Now it must be fought.

He was already busy with his staff in an attempt to swing the issue. He cut into the lines of Asiatics with the primary effect set at full power, doing a satisfying amount of slaughter. Then he decided on a change in tactics—colloidal explosion. It was slower and clumsy, but the effect on morale should be advantageous.

He omitted the guide ray to make it more mysterious and sighted through a peephole in the cube of the staff. There! One of the rats was smoke! He had them ranged now—two! Three! Four! Again and again—a dozen or more.

It was too much for the Orientals. They were brave and seasoned soldiers, but they could not fight what they did not understand. They broke and ran, back toward their barracks. Ardmore heard cheers from the scattered Americans, dominated by an authentic rebel yell. Figures rose up from cover and took out after the disorganized Asiatics.

Ardmore called headquarters again. "Circuit A!"

A few seconds' delay and he was answered, "You've got it."

"All officers, attention! Use the organic explosion as much as possible. It scares the hell out of 'em!" He repeated the message and released the circuit.

He directed Bryan to go closer to the buildings. Bryan bumped the car up over a curb and complied, weaving in and out between trees. They were conscious of a terrific explosion; the car rose a few feet in

the air and came lurching down on its side. Ardmore pulled himself together and attempted to get up. It was then that he realized that somehow he had held his staff clear.

The door above him was jammed. He burned his way clear with the staff and clambered out. He looked back in to Bryan. "Are you hurt?"

"Not much." Bryan shook himself. "Cracked my left collarbone, maybe."

"Here—grab my hand. Can you make it? I've got to hang on to my staff." Between them they got him out. "I'll have to leave you. Got your basic weapon?"

"Yes, sir."

"All right. Good luck." He glanced at the crater as he moved away. It was well, he thought, that he had had his shield turned on.

THE FEW DOZEN whites were moving cautiously among the buildings, shooting as they went. Twice Ardmore was fired on by men who had been told to shoot first. Good boys! Shoot anything that moves!

A Pan-Asian aircraft, flying low, cut slowly across the edge of the campus. It trailed a plume of heavy yellow fog. Gas! They were gasping their own troops in order to kill a handful of Americans. The bank of mist settled slowly toward the ground and rolled in his direction. He suddenly realized that this was serious, for him as well as for others. His shield was little protection against gas, for it was necessary to let air filter through it.

But he was attempting to get a line on the aircraft even as he decided that his own turn had come. The craft wavered and crashed before he could line up on it. So the scout car was on the job after all—good! The gas came on. Could he run around the edge of it? No.

Perhaps he could hold his breath and run through it, trusting to his shield for all other matters. Not likely.

Some unconscious recess of his brain gave him the answer—transmutation. A few seconds later, his staff set to radiate in a wide cone, he was blasting a hole in the deadly cloud. Back and forth he swept the cone, as if playing a stream of water with a hose, and the foggy particles changed to harmless, life-giving oxygen.

"Jeff?"

"Yes, Chief?"

"Any trouble with gas?"

"Quite a bit. In—"

"Never mind. Broadcast this on Circuit A: Set staff to—" He went on to describe how to fight that most intangible weapon.

The scout car came screaming down out of heaven, hovered, and began cruising back and forth over the dormitory barracks. The campus became suddenly very silent. That was better; apparently the pilot had just had too much to do at one time. Ardmore felt suddenly alone, the fight had moved on past him while he was dealing with the gas threat. He looked around for transportation to commandeer in order to scout around and check up

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on the fighting in the rest of the city. The trouble with this damn battle, he thought to himself, is that it hasn't any coherence; it's every place at once. No help for it; it was in the nature of the problem.

"Chief?" It was Thomas calling.

"Go ahead, Jeff."

"Wilkie is heading your way."

"Good. Has he had any luck?"

"Yes, but just wait till you see!"

I caught a glimpse of it in the screen, transmitted from Kansas City. That's all now."

"O. K." He looked around again for transportation. He wanted to be around some Pan-Asians, some live Pan-Asians, when Wilkie arrived. There was a monocycle standing at the curb, abandoned, about a block from the campus. He appropriated it.

There were Pan-Asians, he discovered, in plenty near the palace—and the battle was not going too well for the whites. He added the effort of his staff and was very busy picking out individuals and exploding them when Wilkie arrived.

Enormous, incredible, a Gargantuan manlike figure of perfect black—more than a thousand feet high, it came striding across tall buildings, its feet filling the streets. It was as if the Empire State Building had gone for a stroll—a giant, three-dimensional shadow of a priest of Mota, complete with robes and staff.

It had a voice.

It had a voice that rolled with thunder, audible and distinct for miles. "White men, arise! The day is at hand! The Disciple has come! Rise up and smite your masters!"

Ardmore wondered how the men in the car could stand the noise, wondered also if they were flying inside the projection, or somewhere above it.

The voice changed to the Pan-Asian tongue. Ardmore could not understand the words, but he knew

the general line it would take. Downer was telling the war lords that vengeance was upon them, and that any who wished to save their yellow skins would be wise to flee at once. He was telling them that, but with a great deal more emphasis and attention to detail and with an acute knowledge of their psychological weaknesses.

The gross and horrifying pseudo-creature stopped in the park before the palace, and, leaning over, touched a massive finger to a fleeing Asiatic. The man disappeared. He straightened up and again addressed the world in Pan-Asian—but the square no longer contained Pan-Asians.

THE FIGHTING continued sporadically for hours, but it was no longer a battle; it was more in the nature of vermin extermination. Some of the Orientals surrendered; more died by their own hand; most died purposefully at the hands of their late serfs. A consolidated report from Thomas to Ardmore concerning the degree of progress in mopping up throughout the country was interrupted by the communications officer. "Urgent call from the priest in the capital city, sir."

"Put him on."

A second voice continued, "Major Ardmore?"

"Yes. Go ahead."

"We have captured the Prince Royal—"

"The hell you say!"

"Yes, sir. I request your permission to execute him."

"No!"

"What was that, sir?"

"No! You heard me. I'll see him at your headquarters. Mind you don't let anything happen to him!"

Ardmore took time to shave off

his beard and to change into uniform before he had the Prince Royal brought before him. When at last the Pan-Asian ruler stood before him he looked up and said without ceremony, "Any of your people I can save will be loaded up and shipped back where they came from."

"You are gracious."

"I suppose you know by now that you were tricked, hoaxed, by science that your culture can't match. You could have wiped us out any time, almost up to the last."

The Oriental remained impassive. Ardmore hoped fervently that the calm was superficial. He continued, "What I said about your people does not apply to you. I shall hold you as a common criminal."

The Prince's brows shot up. "For making war?"

"No. For the mass murder you ordered in the territory of the United States—your 'educational' lesson. You will be tried by a jury, like any other common criminal, and, I strongly suspect—hanged by the neck until you are dead!"

"That's all. Take him away."

"One moment, please."

"What is it?"

"You recall the chess problem you saw in my palace?"

"What of it?"

"Could you give me that four-move solution?"

"Oh, *that*." Ardmore laughed heartily. "You'll believe anything, won't you? I had no solution; I was simply bluffing."

It was clear for an instant that something at last had cracked the Prince's cold self-control.

He never came to trial. They found him the next morning, his head collapsed across the chess-board he had asked for.



## BRASS TACKS

*Schachner is starting a new series that looks excellent. Adventures of a space lawyer!*

Dear Sirs:

Herewith my subscription, November, 1940, to October, 1941, for your interesting Astounding stories. I have taken it without a break—in spite of Mr. Hitler—ever since Street & Smith took it over, and hope to continue taking it until anno Domini puts a period to my capacity to read it. That is conditional, however, on it remaining under the guidance of as good a craftsman as yourself.

You have lifted Astounding stories out of the rut of Escape literature, and I read and enjoy it on account of its literary value. You may be interested in passing to know that I have all your own stories—every one—carefully detached in proper sequence and professionally bound; and I would not part with them for quite a lot of money.

Thanks for the September number just received. I notice your readers are wholeheartedly enthusiastic about the "Final Blackout." Sorry, Mr. Campbell, but I don't regard this as a science-fiction story. It is a first-class yarn, and it is real literature, but it is merely an historical story of a military genius, set in the near future instead of in the past. There are quite a number of such on the market. Offhand, let me quote, "The Purple Pirate"—the last of trilogy—by Talbot Mundy, and "Bel-

larion," by Rafael Sabatini. "Final Blackout," though very good, is not up to either of these two alone. It is not long enough to afford opportunity for characterization, which is the real test of genius in a novel.

I am not greatly impressed with Heinlein. He writes well, but unless I miss my mark he will not last, for he is an opportunist in his plots, and an opportunist develops into a hack-writer. He could write just as entertainingly for the *Sunday Herald*; he would just suit his plots to his environments. I hate to seem unkind, but truth must prevail.

And now may I enter the lists about Mr. Smith—THE Mr. Smith. I have been itching to spill my opinion about him for years, and now I intend to repress no longer. I suppose this letter will find its way into the w. p. b., but I should really like to know what other readers' opinions are my impressions of him.

I regard Mr. Smith as a victim of circumstances. His first yarn, "The Skylark of Space"—I have all the Skylark stories, too, professionally bound and in proper sequence—was the best interplanetary yarn I have ever read, not even excluding your own. And I've been reading them for forty years. His hero was an ordinary, plain fellow, even if he was a genius. He was dashing and devil-may-care, and was slangy like you and me. After the initial discovery, the story developed logically, with human and interesting characters. It had every-

thing a good story should have; a first-class villain, plenty of adventure and excitement, plenty of science—sketched sparingly, not slapped on with a whitewash brush—to add conviction, and plenty of good, sound character drawing.

It created a furore. Even now, after all this time, we hear constant echoes of the roars of approval.

Mr. Smith lost his head and his mental balance. He must needs try to cap it; and cap it again and yet again, each time creating a character more wildly fantastic than before; until at last even his most ardent devotees turn against him; and the mighty Kimball Kinnison, the doyen of them all, merely provokes a titter.

Try again, Mr. Smith. You have real genius. I do not know any writer besides yourself, who can draw such convincing pictures of alien civilizations and make them seem normal. You have landed yourself into a mess, and if you try to cap "Gray Lensman," you will be going Bogey Bogey and landing yourself into a padded room. Start at the beginning again, and just write about plain, ordinary folks again.

About Nat Schachner. Give him a rest, or persuade him to write some other type of story for a while. He can write; witness "Cold," in your March issue. But a rest or a change will benefit him and your readers alike.

Of your present bunch of writers, I like de Camp best of all. He is one of the fellows I would love to meet. His branch of humor hits me just where I live. His stories and his articles alike have an air of benign detachment which is as rare as it is attractive. He writes as if he wrote for the fun of it. And there is nothing more attractive than artful artlessness!

Here is my list for the last few months—one has to be in the fashion. I only give one of van Vogt's "monster" series. The others, though good stories, merely ring the changes on the same theme. "Vault of the Beast," in particular, was done ages ago by Don Stuart, and immeasurably better in "Who Goes There?"

1 "Black Destroyer." Original, well-written.

2 "Crisis in Utopia." Original, novel subject, plausible, well-written.

3 "Final Blackout." Typical subject, entertaining and well-constructed.

4a "Repetition." 4b "Admiral's Inspection." Two gems of character drawing. Hot-headed youth and wise middle-age excellently contrasted.

5 "Cold." Excellent character study.

6 "And Then There Was One." First-class melodrama. Enjoyed every word of it. Never mind the screwy science.

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7 "Reincarnation." Don't like robot stories, as a rule, but this was good literature.

8 "Space Guards." A good wild West yarn.

9 And all the "Johnny Black" yarns. I love a bit of humor, even with my science-fiction.

The most humorous story you ever printed was "Hyperpilosity." Alas, such an idea for a plot only comes once in a hundred years!—E. E. Simpson, 11 Lawn Rd., Doncaster, England.

#### Artists and Authors.

Dear Mr. Campbell:

I might as well make a regular monthly comment in re Astounding, so I'll clarify my ratings, in sympathy with the Analytical Laboratory. Starting with three stars, is the average level of del Rey and Jameson; in other words, just good, with no motive needed. Four stars reaches the level of de Camp and Knight, and is usually good enough to elicit a few squeals of joy. Five stars represents Doc Smith's own private bailiwick, and is in the region of the glassy stare and the hushed breath. Six stars, that rarest of jewels, only shows itself when Stuart sounds its mating call, or in the very rare case of a "Sinister Barrier." Reaction is generally unpredictable but violent. If the illustrator gets a star, it means "excellent"; if two stars, "superlative"; if three stars, refer to Rogers "Gray Lensman" cover.

That finished with, here is my version of the November issue:

"SLAN"*****	
A. E. van Vogt	Schneeman*
"SALVAGE"*****	
Viv Phillips	Schneeman*
"THE EXALTED"****	
L. Sprague de Camp	Cartier*
"ONE WAS STUBBORN"***	
Rene La Fayette	Cartier
"SUNSPOT PURGE"***	
Clifford D. Simak	Kramer

Little more need be said, except that I rate "Slan" better than anything of Smith's, unless it be all his stories put together. Kramer is a welcome relief from the dramatic but drastic Schneeman and Cartier.—Dick Wortman, 842 East 97th Street, Seattle, Washington.

Back issues wanted.

Dear Mr. Campbell:

S O S to anybody willing to rent their issues of Astounding which contain any of

E. E. Smith's works. Because of their value as collectors items, I am not asking to buy them, although if anyone must sell, I'll buy with pleasure. Send all offers to the following name and address:—Wm. D. Calhoun, 727 Glenwood Rd., Glendale, California.

*But we're a long, long way from understanding those protiens!*

Dear Mr. Campbell:

Here's my ratings for the January Astounding:

1. "Doom Ship"
2. "The Day We Celebrate"
3. "The Mechanical Mice"
4. "The Opportunists"
5. "Sixth Column"
6. "Lost Rocket"
7. "The Traitor"

On the subject of "Sixth Column": 1. I don't like this kind of stuff: "this crazy world—in which the superiority of the white man was not a casually accepted 'of course.'" 2. It was very stale stuff and didn't move very fast. 3. The science *was* good. 4. I think it will gather momentum as it rolls; it better had.

It was a better than average number, and the best thing in it was the article "Starting Point." By heck, I'm glad to get a little fuel for my frequent arguments, that in organic chemistry lies the easiest and likeliest way toward a decent solution to the problems in genetics, bacteriology, et cetera. For instance, I am inclined to doubt the possibility of that trick that was tried in "Slan," eliminating certain characteristics for a certain number of generations. For the properties of the genes are probably merely those of the proteins making them up, and if this is true, then any alteration in the genes would change the characteristics for good.

And I like that idea of the genes being merely protein molecules. There are infinitely many possible arrangements of the carbon, hydrogen, oxygen, nitrogen and sulphur by the rules of organic chemistry that these giant molecules could contain all the inherited traits in their very structure. As to mutants, these X ray mutation machines make the idea look pretty good that the genes are unstable and cosmic rays excite the atoms occasionally. This would cause a sort of shuffling of the inherited characteristics, or if some of the less complex

radicles were *broken down*, very different characteristics, in the next generation. Anyone care to argue that? Or set me right if I'm all off? I'm only a junior in high school.

About the only subject I haven't talked about is the column "In Times to Come," and let me tell you, I'm glad there's a story by Heinlein coming.—Chandler Davis, 309 Lake Avenue, Newton Highlands, Mass.

*Review of the year.*

Dear Mr. Campbell:

This being December, I thought it would be a good time to review Astounding for the past year.

To begin with, the flood of new science-fiction magazines onto the market in the past twelve or fifteen months has made it next to impossible for even a rabid fan to read them all. Accordingly, I carefully went over several issues of each some months ago, and eliminated all but three. And of those three, Astounding is at the top.

The reasons for this are manifold. The most obvious is that it is the only one without a lurid cover, showing impossible scenes and covered from top to bottom with printing. Secondly, what other magazine gives us that boon to readers-in-bed and collectors, trimmed edges? And in what other science-fiction periodical do we find uniform bindings and at least *some* good quality paper, not to mention 160 (count 'em) pages?

But it's stories that make the magazine, in the final analysis, I hear someone say. True enough; but it's appearance that sells it in the first place. And after that, the stories keep the customer. Here, too, Astounding tops them all.

Why? We get plausible stories—with a few exceptions: "One Was Stubborn"—with plausible backgrounds. We get different stories—"Admiral's Inspection." We get stories that are *remembered*—almost all short stories, because they necessarily leave out much in the way of character delineation, et cetera, are quickly forgotten, and that eliminates many of your competitors from possible Halls of Fame.

For top story of the year, I nominate "Final Blackout." The choice is difficult, due to severe competition, but inescapable. Seldom have I read such a powerful and moving novel in any publication. Rather,

I should say, never. Presenting, first of all, a completely believable story, timely, based on a logical outcome of the present world situation, Hubbard has given us an unforgettable character in the Lieutenant. Cold, able, ruthless, he goes on, almost inevitably, to triumph over all odds, only to lose in the end in a climax, completely unexpected, that moved me perilously close to tears. The entire atmosphere of the story is somber, and Hubbard instills a perfect quality of frustration and hopelessness—perhaps prophetic of actual things to come. All honors to Hubbard.

Immediately on the Lieutenant's heels comes Jommy Cross. Van Vogt completely justifies your advance blurbs on "Slan" in as fascinating and breath-taking story—and a different story—as I have seen. Here again, the author's mastery of words is such that the scene of Kathleen's death, and later, of her "resurrection" are enough to bring tears to the unwary. And when a story can come close to making me cry, brother, it's a story. Not that I measure the worth of a tale by its tear-jerking qualities. I am merely illustrating by an example, the effectiveness of the entire work.

The presence of two such outstanding novels as those above causes the astounding situation of a Dr. Smith story in third place. And "Gray Lensman" is probably one of Smith's best. No use discussing the story. Smith's "Super-super" formula never fails, and I look forward to Kinnison's next adventures. Dr. Smith, are you working on them, I hope?

As for the other serials, "If This Goes On—" is a prime example of psychology invading the s-f field. In its present volume, particularly in Astounding, this trend is the most noteworthy development in the past year or two. The endless short stories being ground out on mechanical s-f themes pall after a while, and the new trend, if not overdone is very welcome. The story in question suffers in comparison to the giants of the same year, but by itself is good.

"Crisis in Utopia" pales besides the others, though the second installment is lively enough.

Some of the shorts, particularly those exhibiting the aforementioned psychological trend are noteworthy: "And Then There Was One," "Cold," in which s-f's one-time master of the voluminous near-hack reaches a real high, "The Roads Must Roll," and Heinlein rolls along as one of your better authors; "Coventry," and more Heinlein;

"The Idealist" and "The Kilkeenny Cats," and we hope more of von Rachen's series, "Rendezvous" and Berryman clicks only a little less loudly than in "Special Flight," "Blowups Happen" and again Heinlein, "The Warrior Race," "Fog" which presents that less glamorous side of revolutions which the average man sees.

And of the mechanical and adventure type of s-f, some merit special attention: "Neutral Vessel" shows that Vincent still can put out the real stuff on occasion, and shows, incidentally, the same sort of thing—solutions of unbelievably difficult mechanical problems on a space flight—that made headliners of "Special Flight" and "Admiral's Inspection." "Locked Out" is of similar stuff, and a fine short. "The Professor Was a Thief" was unusual. "Repetition" should have been mentioned above. "Vault of the Beast," though it seems to indicate a sort of van Vogt formula—e. g. "Discord in Scarlet" and "Black Destroyer"—still stands ably on its own feet. "Clerical Error" represents the better Simak. "Homo Sol" is amusing. "White Mutiny" is Jameson's best, a worthy successor to "Admiral's Inspection." "Runaway Cargo" shows that Schachner improves when he produces fewer stories. "Salvage" indicates that Vic Phillips is a man to watch.

A few stories I disliked. My pet hate is the one wherein the world comes to a sad end: "Sunspot Purge," "Quietus," "Last of the Asterites," "In the Day of the Cold." Next comes the sad death of any planet: "Unguh Made a Fire." This criticism is aside from any fundamental worths of the stories. Other dislikes: dawn-of-man stories, "Reincarnate," in which a trite ending spoiled a good story; "Deputy Correspondent," wherein Vincent strikes a new low in triviality; "The Red Death of Mars"—purest hack—belonged in a competitive magazine that dotes on such; "Farewell to the Master," which I could not figure out; the Johnny Black stories, while amusing, leave me cold, except the most recent, "The Exalted," wherein the professor saves things to make an amusing yarn. "Butyl and the Breather," "One Was Stubborn" and "Emergency Landing" belonged in *Unknown*.

The rest of the stories were more or less good without being noteworthy.

I believe that all s-f stories should have a plausible background, and all phenomena and machines should have an adequate description, except in sequels.

As for illustrations. The covers are, on the whole, good. Humans look like humans, and the coloring is not too violent. The Einstein eclipse was especially fine of the astronomical covers, of which give us more. Rogers is adequate, but an occasional change is always good. I still like Wesso. The February cover is especially notable. Rogers' use of grays is extremely effective. The inside pictures present the magazine's weakest point. Whether you use your present artists because Street & Smith demand it or because of your own ideas, I dunno. The Schneeman-Isip-Kolliker combination is not always good. And Kramer and Rogers—inside—are not so hot either. I still like Wesso. All these birds have some very fine moments: S's jackets for "Slam" and "Final Blackout," K's "Reincarnate"—brrr—and so on. But they all fall flat on occasion, and none are as consistently dependable as Wesso. I still like him. However, I will admit that I am growing accustomed to Astounding's new illustrators, and their work grows on me. I might even find myself liking the majority of it. Schneeman can be very good. And so can Wesso.

It would be nice if the editor would occasionally answer a letter in the readers' column. Make it more cozy, what? But the editor's editorials are always very readable and timely. I continually regret the editor's withdrawal from active writing. His monthly articles in Astounding some time ago were most interesting. And since he started editing, we have lost two of our best authors: Campbell and Stuart!

The articles are always informative, usually interesting, sometimes too deep. Ley is always tops: "The Search For Zero" was a crowning achievement. So is de Camp: "The Science of Whithering." Really,



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they're all good. But remember the name is Astounding Science-Fiction.

And, adding fuel to a fire, I thought "General Swamp" was one of your best. Plausible science, and George Washington tactics.

In conclusion I request: Heinlein, de Camp, van Vogt, Phillips, Berryman, von Rachen, Hubbard, and—er—Wesso. It goes without saying, that an automatic request is made for Smith, Campbell and Stuart. Thanks for omitting Kummer.—Charles Johnson, 238 Maypole Road, Upper Darby, Pa.

# SCIENCE DISCUSSIONS

## Bibliography for Symbolic Logic.

Dear Mr. Campbell:

With your permission I would like to give a fuller answer to the request from Joseph Ryus (Astounding—January, 1941) for a bibliography on the "algebra of analysis," better known as symbolic logic.

Two excellent introductory works are "The Theory of Logic," by Ushenko, and "Formal Logic," by Bennet and Baylis; but for the serious student a much more comprehensive, and not too difficult, text is "Symbolic Logic," by C. I. Lewis and C. H. Langford. In addition to the above, there is a very recent book, "Mathematical Logic," by W. V. Quine, which is well recommended—in fact, Quine's breathtaking methodological innovations have received highest praise from Professor A. N. Whitehead, no less!

These are purely logical works, but if anyone is interested in applied logic, recent improvements in scientific method, et cetera, I would strongly urge him to read "Science and Sanity," by Alfred Korzybski—a new edition of which should be off the press by the time this is printed.

None of the above require any previous grounding in mathematics, but they furnish, in themselves, an excellent background for the student who wishes to go on to the general theory of numbers, theory of groups, rings, and the algebra of matrices, et cetera.

I would like to add that symbolic logic is rather seductive in its own merits alone. To the sensitive mind, its clarity of definition, and nowhere-equalled rigor of proof, will give a vista of abstract beauty that cannot be easily matched. Since many readers of Astounding are quite passionately analytical, they would probably enjoy this subject.—Philip Wolston, 1130 Court St., Apt. B, Los Angeles, California.

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